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CONTRIBUTIONS FROM THE CRYPTOGAMIC LABORATORY
OF HARVARD UNIVERSITY. No. LXXXVII.

NEW DIMORPHOMYCETEAE.

BY ROLAND THAXTER.

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THE Dimorphomyceteae, or unisexual Peyritsiellaceae, include those unisexual forms among the Laboulbeniales in which the male individual possesses one or more compound antheridia, and include the three genera *Dimorphomyces*, *Dimeromyces* and *Streblomyces*, to which a third, *Polyandromyces*, is now added. In the present Contribution I have given a list of all forms of this type which have been published hitherto, and have added a large number from various parts of the world which are new and in many cases very peculiar and interesting. The greater number of the latter belong to *Dimeromyces*, a genus which, like *Rickia*, has proved to be unexpectedly important numerically, and to occur on a considerable variety of unrelated hosts belonging to various families of the Coleoptera, Diptera, Orthoptera and Acarini.

A study of this large series of species, and a comparison of more abundant material of *Dimorphomyces* than has been hitherto available, has served to make clear a number of doubtful points in regard to homologies and development in these two genera, and has emphasized the fact that the two are much more closely related than I had at first supposed.

Typical forms of *Dimorphomyces* are clearly and easily distinguished from normally developed species of *Dimeromyces* by the cell-relations in the mature female, which, in the last mentioned genus, consists of a primary axis of superposed cells, variable in number and terminated by a more or less clearly distinguished terminal primary appendage. In very young individuals this axis consists of a two-celled primary receptacle, terminated by the appendage. The basal and subbasal cell of the primary receptacle, which are formed by the first division of the basal spore-segment, are thus in contact one above the other;

but owing to the early activity of the former, from the upper portion of which new cells are rapidly separated, the relation of the two is changed, and the primary subbasal cell becomes the terminal cell of a series which is thus intercalated between the two, and usually forms the fertile portion of a variably developed axis. This simple condition may be complicated by further secondary cell-activities in special cases, but the fundamental cell-relations are the same in all.

In *Dimorphomyces*, on the other hand, although essentially the same process of development takes place and the series of intercalated cells, which has been called the secondary receptacle and from which the perithecia and secondary appendages arise, is produced in a similar fashion, the primary subbasal cell, with its primary appendage, retain their original relations to the basal cell. The apparent difference between the two is due to the fact that an outgrowth from the basal cell pushes up beside the subbasal cell, and cutting off a variable number of successive cells from its tip, gives rise to the so-called secondary axis. Although the base of this axis appears to have been derived from the subbasal cell, it is necessarily associated throughout its length with the progressive protrusion of the basal cell which forms a continuous margin, the lumen of which extends from its apex to the foot; although in older individuals it may be somewhat obliterated by secondary thickening of the wall. The secondary fertile axis is thus also a secondary development intercalated between the primary basal and subbasal cells, and although the latter remains in contact with the former, it represents the terminal cell of the axis in *Dimeromyces*, the subbasal cell of which would correspond to the distal cell of the secondary axis in *Dimorphomyces*. In certain species of the genus a further complication arises from the production of a second fertile axis, similar to the first in structure and development, and often symmetrical in form and position, on the opposite side; but which originates from the primary subbasal cell, an extension of the latter forming a continuous margin on its under side exactly like that of the first, but differing from the fact that its lumen is continuous with that of the subbasal cell. In certain aberrant species of *Dimeromyces*, like *D. Necrotalis* herewith described, a somewhat similar condition is present; the fertile axis being more or less horizontal, and two or three of its lower cells being margined by a slight extension of the basal cell. As in all other species of the genus, however, the primary subbasal cell has become the terminal cell, far removed from contact with the basal and bearing the primary appendage. On the other hand certain species of *Dimorphomyces* like *D. Pachytelis* and certain

acarine parasites approach *Dimoromyces* in their characters, and it is even possible that the two genera may have ultimately to be united.

Of the remaining genera *Nycteromyces* contains but a single species on *Strebla*, *N. Streblidinus*, and is clearly distinguished by the possession of a permanent bicellular receptacle in the female, and seriate lateral antheridia in the male. The new genus *Polyandromyces*, herewith described, with one species and a variety on species of *Coptosoma*, is unlike the others in possessing a single highly developed terminal antheridium in the male, while the female approaches *Dimoromyces* in its structure.

The species of *Dimorphomyces* and *Dimoromyces* hitherto described are as follows:

DIMORPHOMYCES. On Coleoptera. *D. Argentinensis* Speg. (*D. Meroneæ* Th.): *D. denticulatus* Th.: *D. muticus* Th.: *D. Myrmedoniae* Th.: *D. Platensis* Speg.: *D. Thleoporæ* Th.: *D. Trogophloei* Speg.: *D. verticalis* Th.: *D. vulgatissimus* Speg.

DIMEROMYCES. On Coleoptera. *D. Africanus* Th.: *D. Aulacophoræ* Th.: *D. brachiatus* Th.: *D. Corynetis* Th.: *D. Hermocophagæ* Th.: *D. Homophoetæ* Th.: *D. Longitarsi* Th.: *D. nanomasculus* Th.: *D. Petchi* Th.: *D. pinnatus* Th.

On Orthoptera. *D. Anisolabis* Th.: *D. appressus* Th.: *D. Forficulæ* Th.: *D. Labiæ* Th.: *D. minutissimus* Th.: *D. Thaxteri* Maire (*D. falcatus* Th. nec Paoli).

On Diptera. *D. coarctatus* Th.: *D. crispatus* Th.: *D. Kameruncensis* Th.: *D. Oscinosomalis* Th.: *D. pedalis* Th.: *D. rhizophorus* Th.

On Acarini. *D. falcatus* Paoli: *D. mucronatus* Paoli: *D. muticus* Paoli.

A possible addition to this list may be found in the *Corethromyces andicolus* of Spegazzini, parasitic on *Chiliodis*, which is undoubtedly either a species of *Dimoromyces*, or of *Eudimoromyces*, the only described species of which, from Chile, occurs on a host of the same genus. The disorganization of the cells of the peritheciium below the ascogenic cell, clearly shown in Spegazzini's figure, is found only in the Dimorphomyceteae and in *Amorphomyces* among the unisexual genera, never in *Corethromyces*. Spegazzini's *Rickia Formicicola* may also prove to be a species of *Dimorphomyces*, allied to the peculiar types on mites herewith described; but the published figures are not detailed enough to make a generic determination definite, in this case.

A few other species of *Dimoromyces* have been observed by the writer, but are not here included, owing to the insufficiency of the material, or for other reasons. As in previous instances, I am indebted

to the kindness of Mr. Arrow of the British Museum for many determinations and to the late Dr. Kellerman, Mr. Schwab, Mr. W. H. Weston and others for sending me miscellaneous insects for examination.

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Polyandromyces nov. gen.

Male individual consisting of a two-celled receptacle bearing a single terminal antheridium. Antheridium consisting of a well defined stalk-cell, a venter containing very numerous antheridial cells

discharging its bacillus-like antherozoids into a large cavity and out through a well developed neck.

Female individual. Receptacle consisting of five superposed cells, terminated by a two-celled undifferentiated appendage, a single perithecium arising from the third cell. Stalk- and basal cells of the perithecium obliterated at maturity, the cavity continuous below the ascogenous cell to the insertion.

Except for the greater number of cells in its receptacle, the female of this type closely resembles that of *Nycteromyces* to which it is most nearly allied. The male, however, differs widely in possessing a single terminal antheridium, which is more highly developed than that of any other genus, with the exception of *Eumonoicomyces*.

Polyandromyces Coptosomalis nov. sp.

Male individual. Basal cell of receptacle relatively large and long, hyaline or yellowish, straight or often strongly curved, obliquely adjusted to the small triangular brownish yellow subbasal cell. Antheridium straight, erect, reddish brown below, the base of the venter darker; the stalk-cell squarish, or slightly broader than long; the venter relatively large, symmetrical, somewhat inflated, often rather abruptly broader; the efferent chamber large, almost dome-shaped, separated by a slight constriction from the characteristic enlargement which forms the base of the efferent neck. Antheridium $64 \times 25 \mu$; stalk-cell $16 \times 16-21 \mu$; venter $30 \times 26 \mu$; efferent chamber $125 \times 16 \mu$; neck 22μ . Total length, average, 135μ .

Female individual yellowish, becoming more or less deeply tinged with reddish brown. Receptacle consisting of five obliquely superposed cells; the basal larger, the subbasal separating a small cell which subtends, externally, the short stalk of the perithecium which arises from the third cell: the fourth cell smaller than the rest, narrowly triangular, oblique: appendage erect or suberect, the distal cell slightly longer, somewhat tapering and bluntly rounded. Perithecium erect, nearly symmetrical above the very short curved stalk, the margins slightly and symmetrically convex: the tip clearly distinguished by a more prominent basal and less distinct distal elevation and intervening depression: apex very short, abruptly defined, distally flattened or slightly rounded. Perithecia $24-280-50-55 \mu$. Appendage $30 \times 20 \mu$. Receptacle $105 \times 34 \mu$. Total length to tip of perithecium $300-345 \mu$.

On the legs of *Coptosoma maculatum* Westw. No. 2800 (Type), Madagascar (M. C. Z., Wulsin). No. 2960 on *Coptosoma* sp. Suene, Fiji (M. C. Z., Mann), also 2960, Wai Ai, Solomon Islands (M. C. Z., Mann).

The material from Fiji and the Solomons is somewhat smaller than the type and grows for the most part on the margin of the abdomen. The differentiation of the tip is even more pronounced, the appendage slightly narrower and more reddish: but there are no essential differences. The antheridia seem to contain several dozen antheridial cells, and the sperm-cells are discharged in a mass which fills the chamber and neck with bacillus-like elements.

A form has been observed on a *Coptosoma* from Kamerun which is perhaps sufficiently distinct for varietal separation and may be distinguished as

POLYANDROMYCES COPTOSOMALIS, var. **minor** nov. var.

The general structure similar to that of the type, smaller and stouter, the perithecium asymmetrical, externally straight or concave, the tip hardly distinguished, the apex relatively broader. The male similar but somewhat smaller. Perithecia 135×38 – $150 \times 42 \mu$. Receptacle $40 \times 34 \mu$. Appendage $20 \times 12 \mu$. Total length 160–190 μ . The male 100–105 μ .

On *Coptosoma* sp. 3103. Kamerun, West Africa.

Although this form is separable at a glance from any of the abundant specimens of the type, owing to its smaller size and somewhat different perithecium, the variation does not seem to be more than might readily be included in a single species. The variety was found only at the tip of the abdomen, and is seen with difficulty beneath the projecting segment.

***Dimorphomyces Bledii* nov. sp.**

Male individual relatively large and stout, faintly tinged with brownish yellow, receptacle composed of two nearly equal cells obliquely separated. Appendage short stout two celled, the wall of the upper of the two nearly equal cells distally thickened. Appendage and antheridium diverging slightly, the latter sessile on a broad base, the stalk-cell very small, the venter inflated, broad, the neck well distinguished, bent upward. Antheridium $23 \times 9.5 \mu$. Appendage $9.5 \times 5 \mu$. Receptacle $13 \times 8 \mu$. Total length to tip of antheridium 42 μ .

Female individual pale yellowish with brown tinges. Receptacle developing two fertile axes; a primary, larger and margined by the basal cell; a secondary shorter, asymmetrical in relation to the primary, developed from and margined by an outgrowth of the sub-basal cell. The axes of the usual type, the cells bearing either long flexed appendages, of from seven to fourteen cells, more slender toward the base, the terminal cell also often distinctly more slender; or here and there short bent appendages of two cells separated by a dark septum. Perithecia two or several, the stalk well developed, not abruptly distinguished, the ascigerous portion straight or somewhat bent distally and darker brown, subfusiform, tapering rather gradually to the blunt termination; the tip and apex not distinguished. Primary appendage subcylindrical, two-celled (? always), the cells about equal, the distal thick-walled and bluntly rounded, the basal somewhat darker. Perithecia $80-135 \times 21-22 \mu$. Primary appendage $25 \times 8 \mu$. Longest appendages $250 \times 8 \mu$, short appendage 20μ .

On the head and prothorax of *Bledius emarginatus* Say. Lawrence, Kansas.

I am indebted to Professor Alban Stewart for the host of this species, which he kindly collected for me at electric light. The form described was accompanied by a smaller one on the abdomen which may prove a different species; but owing to the scantiness of the material it has seemed best to defer its separation. It is allied to *D. vulgatissimus*, but differs in its long stout secondary appendages which bear no resemblance to the slender tapering distally attenuated appendages of the last mentioned species.

Dimorphomyces furcatus nov. sp.

Male individual pale brownish, the subbasal cell externally nearly opaque. Basal cell slightly longer than the subbasal, separated from the base of the antheridium by an abrupt indentation. Appendage slender, tapering, its three cells subequal in length, the tip of the distal slightly enlarged. Antheridium stout, sessile, asymmetrical, bulging externally, the stalk-cell well defined; the neck clearly distinguished rather short. Antheridium $28.5 \times 11.5 \mu$. Appendage 29μ . Receptacle, without foot, 32μ . Total length to tip of appendage 56μ .

Female individual becoming rather deeply tinged with brown. Secondary axes two; one, usually slightly larger, developed directly from the small basal cell; the other from the subbasal cell; the general

habit irregularly furcate, asymmetrical, the plane of one axis being usually turned at right angles to that of the other: the first axis diverging at an angle of about 45° , or less; the eight to sixteen cells obliquely superposed. Primary appendage short, two-celled, becoming blackened about the septum and distally: secondary appendages of two forms: short blackened of one or two cells; or much longer, four to six celled, the distal cell distinguished by a slight broad blackened somewhat constricted area. Perithecia relatively large, much longer than the secondary appendages; the stalk portion stout, rather clearly but not abruptly distinguished; the ascigerous region subsymmetrical, the margins convex, progressively darker smoky brown to its junction with the abruptly paler dirty yellowish tip and apex, which are distinguished below by a broad and often very distinct depression; the margins of the tip slightly convex, the short apex slightly distinguished, somewhat asymmetrical as a rule, blunt, the lips often slightly and variably prominent. Perithecia $140-180 \times 22-27 \mu$. Longer secondary appendages $45-95 \times 8.5 \mu$. Secondary receptacles $60-95 \times 20 \mu$.

On *Apocellus* sp., No. 1581, and 1582, Agua Caliente, Guatemala. (Kellerman).

Although the material of the female is sufficiently abundant, one male, only, has been examined. The former seems well distinguished from *D. verticalis* and *D. Myrmedoniae* by its furcate habit, long stout multicellular secondary appendage, and more specialized perithecia. The position of the second secondary appendage, which arises from the subbasal cell and which develops sidewise and is viewed edgewise, makes it almost impossible to determine the exact character of the small dark primary appendage which it subtends. It is also nearly allied to *D. vulgatissimus* of Spegazzini, from which it differs in the character of its secondary appendages and in the relative position and character of its secondary receptacles.

***Dimorphomyces brevirostris* nov. sp.**

Male individual yellowish, becoming tinged with brownish, a deep blackish brown suffusion involving a part, or almost the whole, of the basal cell, and more or less of the posterior margin of the rest of the receptacle; which consists of two or three cells, according as one or two antheridia are developed: the basal cell rather long and narrow, forming a rather well developed stalk, its narrow termination extend-

ing beneath the stalk-cell of the lowest antheridium. Appendage of two stout subequal cells, the upper much thickened distally, and rounded or flattened and somewhat blackish. Antheridia one or often two, straight, erect or slightly divergent, sessile or nearly so, the stalk-cell clearly defined, the venter relatively large, stout and abruptly distinguished from the broad efferent tube region; the neck very short and stout, almost obsolete. Antheridia $23-26 \times 9.5-11 \mu$. Appendage 13μ . Receptacle $25-27 \times 10 \mu$. Total length to tip of antheridia $45-50 \mu$.

Female individual becoming tinged with brownish yellow, a clearly defined and usually contrasting blackish brown area involving the upper half or more of the basal cell proper and the adjacent lower half of the subbasal cell, sometimes also the lower cell of the secondary axis: the basal cell proper forming a well defined rather abruptly distinguished short stalk. Primary appendage usually two-celled, the cells nearly equal, stout with blackish shades about the septa, distally rounded, the walls thickened. Secondary receptacle of six to twelve cells, the series diverging at an angle of about 45° , usually straight and rigid, more rarely slightly curved, slightly tapering, distally bluntly rounded; producing from one to four perithecia, alternating with much shorter two-celled stout secondary appendages; their distal cells tapering very slightly, with rather broadly rounded terminations. Perithecia long fusiform the stalk hardly distinguished; the tip reddish brown, often distinguished by a slight depression when fully mature; the apex slightly broader, flattened or rounded, the inner margin slightly more prominent. Perithecia $75-106 \times 16-20 \mu$. Primary appendage $23-28 \times 10-11.5 \mu$. Secondary $33-42 \times 11.5 \mu$. Secondary receptacle $30-55 \times 12-13 \mu$. Primary basal cell 9μ .

On the abdomen of *Erchomus (Coproporus)* sp.? No. 1662, Mandeville, Jamaica. No. 1652, Los Amates, Guatemala. No. 2228, Amazon (Mann).

This species is most nearly related to *D. Myrmedoniae*, which differs in its brown subcylindrical perithecia, longer secondary appendages, in the absence of a conspicuous blackish suffusion of the basal cell-region, so conspicuous in the present species; but especially in the male, which in *D. brevirrostris* is clearly defined by its blackish suffusion, and the almost obsolete neck of its antheridium.

***Dimorphomyces Eleusinus* nov. sp.**

Male individual tinged with pale brownish yellow, the neck of the antheridium reddish brown. Receptacle two-celled; the appendage

two- (or ? three-) celled, the distal cell distinguished by a dark septum, flask-shaped, its distal third forming a narrow terminal point. Antheridium relatively large, the stalk well defined, the rather short neck slightly curved outward or sidewise. Antheridia $35 \times 9 \mu$. Appendage 20μ . Receptacle 22μ . Total length to tip of antheridium 75μ .

Female individual yellowish, becoming tinged with brownish. Secondary axis of from four or five to ten cells obliquely superposed, clearly margined below by the basal cell, the series diverging at an angle of somewhat less than 45° . Primary appendage similar to that of the male, three-celled. Secondary appendages two or three to seven, mostly dark red-brown, with one or two septa, the lower sometimes dark; the extremity abruptly narrower paler and bent. Perithecium falcate, curved strongly outward over the secondary appendages; the stalk short and not distinguished from the ascigerous part; which is broadest in the middle; the tip not distinguished except by a deep red-brown suffusion along its concave exterior margin; the apex undifferentiated except for a slight indentation below the slightly prominent inner lip. Perithecia $95-105 \times 22-23 \mu$. Secondary receptacle $40-66 \times 13 \mu$. Primary appendage $20 \times 9 \mu$ at base; secondary $50-58 \times 8 \mu$. Total length $130-144 \mu$ to tip of perithecium.

On the margin of the abdomen near the tip of *Eleusis (Isomalus)* sp. No. 3128, Los Baños, Luzon, Philippine Is.

The male of this species has been seen only in association with the female and viewed edgewise, so that it is uncertain whether the appendage consists of two or three cells, or what the form of the receptacle would be in lateral view. The form is well distinguished by the peculiar compressed terminations of all the appendages in both sexes, and by the falcate habit and external distal red-brown suffusion of the perithecium, which is single in each of the four specimens examined, arising close to the primary appendage.

Dimorphomyces Grenadinus nov. sp.

Male individual nearly hyaline, rather slender, the basal cell very small the subbasal long and narrow, about equal to the basal cell of the three-celled appendage, the distal cell of which is subulate. Antheridium relatively large, the stalk-cell long and narrow, free only externally, the venter well distinguished from the very long slender

neck. Antheridia $38 \times 8 \mu$. Receptacle 13μ . Appendage 20μ . Total length 51μ .

Female individual pale yellowish. The basal cell of the primary appendage similar to the subbasal cell of the receptacle, two small cells separated distally, the upper abruptly attenuated. Secondary appendages stout, mostly curved away from the perithecium, somewhat irregular in outline, six to nine-celled. Perithecium single, next the primary appendage and lateral, the stalk not distinguished, the distal third, or half, tapering very slightly to the broad termination, the margin of which is slightly convex, angular on the outer, and subtended by a variably developed short nearly cylindrical projection on the inner side. Perithecia $64-75 \times 17 \mu$. Primary appendage $25-35 \times 8 \mu$. Secondary appendages, longer, $105 \times 10 \mu$ at base.

At the tip of the abdomen of a small aleocharid. Grand Etang, Granada, B. W. I.

The host of this species, which was captured by sweeping in the forest about the Grand Etang, has been unfortunately lost or mislaid. The characters of the species are quite distinctive, the stout curved undifferentiated secondary appendages, the compressed terminal subulate cell of the primary appendage in both sexes, the very long slender neck of the antheridium, and the small well defined projection from the inner angle of the apex of the perithecium, serve clearly to distinguish it. The conformation is such that the individuals do not lie flat, and a complete side view of the female cannot be obtained.

Dimorphomyces simplex nov. sp.

Male individual short and stout, uniform pale yellowish brown. Receptacle consisting of two or three cells, and bearing one or two antheridia, the basal short and protruding externally beneath the base of the cell or base of the antheridium above it. Appendage rather short, erect, two-celled. Antheridia stout, erect, or but slightly divergent, the stalk-cell clearly defined, the efferent portion of the neck bent abruptly sidewise. Receptacle, without foot, 19μ . Antheridia, to curvature of neck, $20-23 \times 8 \mu$. Appendage 12μ . Total length to curvature of neck 38μ .

Female individual uniform pale yellowish brown, the body of the perithecium and distal cell of the appendages darker. Receptacle short and broad; the basal cell short, its extension clearly defined,

developed on one side only, and curved upward abruptly beneath the usually single secondary appendage; the, usually three, remaining cells bearing the primary appendage, perithecium and secondary appendage respectively. Primary appendage erect, consisting of two nearly equal cells, or sometimes three, the distal terminally somewhat disorganized; the cell of the receptacle which bears it, rarely producing a second perithecium; the secondary appendage similar to the primary, two-celled, slightly shorter and more slender. Perithecium usually single, the stalk often rather abruptly broader, distally, below the ascigerous portion; which is bent abruptly side-wise at an angle of about 45° ; the inner margin strongly convex, the outer concave; the tip distinguished by a very slight elevation externally; tapering to the bluntly pointed apex. Perithecium $65-80 \times 12-15 \mu$. Receptacle, exclusive of foot, $16 \times 16-20 \times 20 \mu$. Primary appendage $21 \times 6 \mu$, secondary $19 \times 5.5-6 \mu$. Total length to tip of perithecium $95-105 \mu$. Foot large.

On the prothorax and elytra of a small tenebrionid (?), No. 2388, Mindanao, P. I. (Weber).

The male and female of this species are so firmly united that I have not been able to isolate the former in good condition. The antheridial neck seems well developed, but is turned abruptly at right angles so that it is viewed end on. The receptacle of the female is relatively very small, with the extension of the basal cell conspicuous and externally upcurved. The goose-neck habit of the perithecium and its stalk are characteristic.

***Dimorphomyces clavuliferus* nov. sp.**

Male individual consisting of two cells, or with a small third cell not distinguished from the base of the erect, two-to three-celled appendage; the terminal cell of which is brown, the subterminal sometimes distinguished by dark septa above as well as below and becoming brownish. Basal cell of the receptacle extending out below the base of the single antheridium, and obliquely separated from the smaller sub-basal cell. Antheridium sessile, its stalk-cell small and flat, the venter bulging externally, the neck curved or bent sidewise. Antheridia $16 \times 6 \mu$. Appendage $8-10 \times 3.5 \mu$. Receptacle $15 \times 9 \mu$. Total length to tip of appendage 32μ .

Female individual subflabelliform, the basal cell forming a slender short stalk and extending sidewise below the four to nine cells of the

compact receptacle. Primary appendage of two or three cells, the distal brown and rounded, the middle, if present, distinguished by dark septa. The cell next the subbasal producing the single perithecium, the rest secondary appendages; which consist of a short basal cell, distinguished above from a long clavate terminal cell by a broad dark septum; the termination conspicuously swollen, darker brown than the more slender portion below. Perithecium with a very short abruptly narrow stalk, or almost sessile; long ovoid, bent to one side, with brown, blunt termination. Perithecia about $30 \times 15 \mu$. Primary appendage $9-12 \times 5.5 \mu$; secondary $26-28 \times 7.5 \mu$ at tip. Receptacle about $20 \times 20 \mu$ more or less.

On the inferior surface of a species of *Uroscius*. Baguio Mt., Luzon, P. I.

The mite bearing this very peculiar species was found in the sediment of a small lot of miscellaneous beetles kindly sent me by Mr. T. V. Reed. The material is not abundant, but the form is very clearly distinguished, by the character of its relatively short broadly clavate secondary appendages, from any other with which it might be confused. It is most nearly related to *D. triangularis*.

Dimorphomyces triangularis nov. sp.

Male individual. Receptacle two-celled, the basal cell long and obliquely flattened, extending upward and outward beneath the antheridium, which appears to be seated on its extremity: subbasal cell oblique below; the appendage three-celled; the basal cell much larger, as long as the second and third combined, the second distinguished above and below by dark septa, and tinged with brownish. Antheridium sessile, the stalk-cell minute and triangular, nearly straight on the inner side, the outer margin bulging prominently, the neck relatively long, erect, strongly curved outward distally, and faintly purplish. Antheridia $17 \times 5.7 \mu$. Appendage $7.6 \times 3.5 \mu$. Receptacle $11.5 \times 7.5 \mu$. Total length to tip of perithecium 32μ .

Female individual becoming unevenly tinged with brownish, usually bent sidewise so that it lies flat on the substratum; the receptacle small and compact, consisting of five or six cells, including the basal which extends out below the secondary portion; the subbasal cell larger than the others, bearing the stout usually three-celled primary appendage, its basal cell broad and undistinguished, the two others subequal, abruptly much smaller, separated by a narrow black

septum; the terminal cell dark brown, a single perithecium arising from the cell next the subbasal, the rest producing secondary appendages consisting usually of three cells, the basal and subbasal subequal and hyaline, the rest of the appendage more or less elongate often slightly narrower above the subbasal cell, purplish brown, tapering more or less to the blunt, or usually rather abruptly enlarged, clavate termination; the successive appendages tending to lie close together and parallel. Perithecium triangular or subtriangular, wholly ascigerous, except for the very short narrow stalk which attaches it by its greater angle; becoming reddish brown, the short apex, only, slightly distinguished, and symmetrically rounded. Perithecia $28-30 \times 15-17 \mu$. Primary appendage $10-12 \times 7.5 \mu$, at base: Secondary $40-125 \mu$. Receptacle $22-28 \times 11.5 \mu$.

On the legs of species of *Celaenopsis*, No. 2069 (Type) Wainoni Bay, Solomon Islands, and No. 2970, Fulakora.

This species is most nearly allied to *D. claruliferus* and is chiefly remarkable for its triangular perithecium which is shaped somewhat like the ascigerous portion in *Dioicomyces malleolaris*, and is similarly inserted on its stalk. In the specimens from Fulakora the appendages are longer and more attenuated, none of them ending in the bubous termination which usually occurs in the material from Wainoni Bay. The general appearance of the form, apart from the specific peculiarities of its perithecium and receptacle suggests that of *Rickia Formicicola* Speg., and it seems not impossible that Spegazzini has not accurately interpreted the characters of the latter, which may possibly prove to be, after all, a species of *Dimorphomyces* or of *Dimicromyces*.

***Dimorphomyces obliqueseptatus* nov. sp.**

Male individual pale yellowish. Receptacle consisting of three cells, the basal and subbasal similar, the latter larger, both distally prominent, about twice as long as broad, subovoid, distinguished by a slight constriction: appendage usually four-celled, the three basal broad and short, the two middle distinguished by rather deep constrictions and distinct black septa. Antheridia usually two, from the subbasal and terminal cells, nearly sessile and erect, the regions clearly distinguished; the neck strongly curved outward or even recurved. Receptacle $38-42 \times 16 \mu$. Appendage $30 \times 5 \mu$. Antheridia $30 \times 8.5 \mu$. Total length to tip of antheridia 68μ , of appendage 70μ .

Female individual pale yellowish or brownish yellow. Receptacle

rather stout and compact, the basal and subbasal cells nearly equal or the latter usually larger and reaching nearly to the foot: the three to four cells of the secondary portion of the receptacle triangular, more or less divergent from the angle between them, and producing a perithecium and two to three secondary appendages. The former arising either from the first secondary cell or from the second, in which case it is associated with the first secondary appendage which arises externally from the same cell: the second and third secondary cells becoming so displaced, as a rule, that they lose contact with the basal cell. Primary appendage consisting of a large basal cell bearing the appendage terminally and a branch laterally, the basal cell of which occupies its whole outer face: the appendage five celled above its base, the second third, and to a less degree the fourth, roundish, separated by distinct constrictions and horizontal black septa; the terminal cell elongate and tapering; the external branch variably developed, the four subterminal cells short; the two middle ones distinguished by conspicuously oblique and blackened septa: the lower, secondary, appendages variable, of ten cells or less, the four subterminal cells similarly modified. Perithecia erect, usually slightly curved, the regions hardly indicated, rather short, the termination blunt and unmodified. Perithecia $55-75 \times 13-14 \mu$. Receptacle $30 \times 16 \mu$. Primary appendage $38-50 \times 4.5 \mu$: its branch and the secondary appendages, longer 120μ . Total length to tip of perithecium $105-120 \mu$.

On the legs of *Pachytles* sp. Verdant Vale, Arima, Trinidad, B. W. I., No. 2821.

This species, which is closely allied to *D. Pachytelis*, appears to be distinguished from it by the characters already mentioned; the curvature of the antheridial necks which resemble those of *D. ramosus*, and the conspicuously blackened and oblique septa near the extremities of the secondary appendages and the basal branch of the primary, being the most evident differences.

Owing to the displacement of the second and third of the secondary cells of the receptacle, they lose their contact with the basal cell, from which they were derived, more or less completely; so that the cell relations in the mature individual are quite confusing, and constitute a deviation from the type which serves still further to diminish the fundamental differences between this genus and *Dimeromyces*.

Dimorphomyces Pachytelis nov. sp.

Male individual tinged with brownish yellow. Receptacle consisting of three cells, the basal long and narrow, extending up to the base of the lower antheridium, below which it is slightly prominent; nearly twice as long as the subbasal, the distal end of which is much broader than the base of the terminal cell which is much smaller. Appendage erect, curved toward the antheridia, consisting of usually five cells, the three middle ones distinguished by very slight constrictions and somewhat darker septa, the terminal cell long and tapering. Primary antheridium arising from the subbasal cell; one, or sometimes two, usually developing later from the terminal cell. Antheridia almost sessile, the venters relatively stout, the necks rather long and clearly distinguished, nearly straight, but bent outwards at the base. Receptacle $65-85 \times 18-28 \mu$, including foot. Appendage, longest, $68 \times 6 \mu$. Antheridia $35-42 \times 9.5-11 \mu$.

Female individual dull brownish yellow. Basal and subbasal cells of the receptacle, including their extensions, subequal, obliquely associated, the former reaching nearly to the base of the latter. The secondary portion of the axis consisting of usually two cells obliquely margined below by the extension upward of the basal cell; the second, outer, giving rise to the usually single secondary appendage externally; the first, inner, bearing the normally single perithecium. Secondary appendage consisting of about a dozen cells, rather stout, rigid, slightly tapering, one to three of its subterminal cells short, small and distinguished by darker septa. Primary appendage consisting of a relatively large slightly tapering basal cell, about twice as long as broad, which bears terminally the short, more slender, abruptly distinguished terminal portion which tapers distally and consists of four or five cells, the three lower slightly longer than broad, the second and third distinguished by darker horizontal septa: while its outer margin is occupied by the bases of usually two lateral branches, less often one, which project upward, diverging very slightly, and similar in general to the *secondary* appendage, the cells somewhat less numerous. Perithecium straight or curved outwards, becoming yellowish, distally gradually broader, the short blunt tip and apex rather clearly distinguished, $100-185 \times 18-34 \mu$. Longer appendages $100-210 \mu$: primary appendage $100-140 \times 6.5 \mu$, its basal cell $25 \times 13 \mu$. Receptacle $75-125 \times 25-40 \mu$.

On the legs of *Pachytelus* sp., Verdant Vale, Arima, Trinidad, B. W. I. No. 2821.

Although a considerable number of specimens of this form have been examined, few of the females are in perfect condition and I have had some hesitation in separating it from the smaller *D. obliqueseptatus*; although the differences which appear to distinguish the two seem constant. In the present species the dark septa of the appendages are always horizontal, the secondary receptacle consists of but two cells bearing a single secondary appendage, while in the male the antheridia lack the abrupt distinction between its successive regions which characterize *D. obliqueseptatus*, as well as the shorter recurved neck which gives the latter its greater individuality.

The species belongs to a small group of forms on the same host, characterized by the presence of adventitious branches from the basal cell of the primary appendage, which are most highly developed, through successive branching, in *D. ramosus*. The perithecium normally develops from the first cell of the secondary receptacle, next the subbasal cell; but if it is unfertilized or its growth for any reason arrested, one may arise from the second cell, which also gives rise to the secondary appendage and is subtended by the latter. A fourth species of this type is known to me from Jamaica, but the material is not sufficient to warrant its description. In general habit all these forms resemble species of *Dimeromyces* more closely than the ordinary types of *Dimorphomyces*, and although the relations of the basal and primary subbasal cells are those characteristic of the latter genus, they form, with *D. Necrotalis* and some of the acarine types, a series of connecting links between the two which suggests that sooner or later they may have to be united.

***Dimorphomyces ramosus* nov. sp.**

Male individual pale somewhat dirty yellowish. Receptacle consisting of three cells; the basal narrow and extending up obliquely beside the base of the subbasal, forming an external prominence which subtends the base of the lowest antheridium: basal septum of the terminal cell transverse; the primary appendage uniformly slender, straight, erect or divergent from the antheridia, its three lower cells small and similar, the second and third distinguished above and below by black septa, the terminal one as long or longer than the rest of the appendage. Antheridia two or three, the upper two arising directly from the terminal cell, without septation, when three are present; sessile, rather stout, the necks well distinguished, strongly

curved outward or even recurved. Receptacle including foot, $55-62 \times 17-20 \mu$. Appendage $38 \times 5.5 \mu$. Antheridia $30 \times 8 \mu$. Total length to tip of antheridia $85-90 \mu$, to tip of appendage 100μ .

Female individual dirty yellowish with a slight tinge of brown. Receptacle consisting of a rather large basal cell, the distal surface of which is obliquely adjusted to the bases of three other cells lying transversely; the anterior bearing the basal of the lower secondary appendage, from which a small cell is usually laterally separated; a middle cell which bears the perithecium, and a posterior cell, the primary subbasal, which extends upward above the insertion of the perithecium and is followed by the large basal cell of the primary appendage, the rest of which is short, much narrower similar to the appendage of the male, brownish, consisting of four, or rarely five cells, the second and third distinguished by dark septa, the terminal one much longer; the whole inserted in the angle made by two highly developed branches which arise on either side of its base from the distal end of the basal cell: these branches greatly elongated, curved, forming a tuft which usually curves outward, downward and backward, at first with much regularity; both similar, two or three times branched, rather closely septate throughout, the ultimate branchlets of the two combined ten or twelve in number; one of these in each case straight, rigid, three- or four-celled, with slightly suffused middle septa. Secondary appendage simple, curved toward and with the branches of the primary appendage, a short two- to three-celled terminal portion with dark septa rather clearly distinguished; or sometimes variably branched, like the branches of the primary appendage, though shorter and less highly developed. Perithecium very large, usually slightly curved throughout the base abruptly bent so that the perithecial axis is turned nearly at right angles to that of the receptacle: the stalk-portion elongate, not distinguished, the ascigerous portion somewhat shorter and slightly broader distally, the tip clearly and abruptly distinguished by subtending elevations, subconical; the apex bluntly rounded, small, not distinguished. Perithecia $350-425 \times 20-22 \mu$. Receptacle including rather large foot $70-85 \times 22-25 \mu$. Primary appendage $64 \times 5 \mu$, upper secondary, 500 to over 1000 μ : lower secondary to 150 μ .

On the inferior tip of abdomen of *Pachyteleles* sp. Nos. 2835 and 2821: Maraval Valley and Verdant Vale, Arima, Trinidad, B. W. I.

Although allied to the other American species on *Pachyteleles* this species is well distinguished by its highly developed secondary branches, the primary terminations of which are usually recognizable,

if unbroken, by their resemblance to the termination of the secondary appendage, when the latter is simple. The structure of the receptacle, as in *D. Pachytelis*, conforms strictly to the type of the genus, the basal cell being in direct contact with all the rest.

Dimeromyces Galumnae nov. sp.

Male individual slightly curved throughout, faintly tinged with brown, consisting of a three-celled receptacle, terminating in a simple terminal three-celled appendage, not abruptly distinguished, the two distal cells somewhat shorter, narrower and paler than the basal. The antheridium partly lateral, incorporated in the axis, arising from the subbasal cell its very short neck lateral. Total length to tip of appendage $50-58 \times 10 \mu$.

Female individual. Receptacle reddish brown, consisting of usually seven cells, the basal nearly hyaline, the second to sixth flattened and very obliquely superposed, the third, fourth and sixth producing secondary appendages; straight, rigid short subhorizontal, or bent upward, that from the second and third usually rudimentary or obsolete; the fifth producing the usually single perithecium, which is recurved when young, later divergent and straight or slightly curved inward, the long slender stalk-portion rather clearly distinguished from the subsymmetrically fusiform body; the inner lip slightly higher and flattened. Basal cell of primary appendage concolorous with the receptacle, more than twice as long as broad, tapering slightly, followed by one or two distinct cells which pass into a very slender and greatly elongated flagellum, stouter, curved or almost clavate at the tip. Perithecia including stalk $115-190 \mu$; the body $\times 15-19 \mu$, the stalk $\times 7.5-11.5 \mu$. Primary appendage, longest 325μ , its smaller diameter 3.8μ , its basal cell $20-24 \times 10-12$ at base.

Prostrate on the upper surface of *Galumna* sp. No. 2976, Lasema, Fiji Is. Mann Coll. M. C. Z.

This species is chiefly peculiar for its enormously elongated primary appendage. The male is unlike that of any other species from the position and very short lateral neck and discharge tube of its antheridium. The receptacle of the female finally lies prostrate on the surface of the host, the long-stalked perithecium projecting upward at right angles.

Dimeromyces Parasiti nov. sp.

Male individual hyaline, relatively long and slender; the foot large, the basal and subbasal cells subequal; the former usually obsolete, or

its lumen almost obliterated; the terminal cell longer and narrow, terminated by a very short two-celled subconical appendage, distinguished by a broad blackish ring, the terminal cell minute and more or less obliterated. Venter of the antheridium closely united to the upper cell of the receptacle, slightly inflated, the region of the efferent tubes concolorous with the long slender translucent brown neck, which is bent over the terminal appendage and slightly curved upward. Total length, including foot, ($12\ \mu$) about $40\ \mu$, the appendage $5.5 \times 4.5\ \mu$. Venter of antheridium, including efferent tubes, $12 \times 6.5\ \mu$: the neck $24 \times 2.5\ \mu$.

Female individual. Axis of the receptacle normally consisting of three cells, the basal sometimes short and subtriangular, more often longer, narrower and nearly uniform; the two remaining cells hardly longer than broad, obliquely superposed, the lower larger; the upper cutting off a small cell next the perithecium by a septum which lies opposite the oblique insertion of the free divergent basal cell of the primary appendage; which is nearly uniform, colorless, and separated by a constriction and broad blackened septum from the abruptly distinguished three celled terminal portion; the lower cell of which is squarish and hyaline, the next slightly longer and broader and concolorous with the much longer olive brown terminal cell: the latter slightly narrowed in the middle, and terminating in an abruptly hyaline glandular subspherical tip, edged below with contrasting blackish brown. Secondary appendage usually single, rarely two subtended by small cells lying anterior to the subbasal cell; the first, and usually the only one, having a considerably elongated basal cell, united on its inner side to the lower third or more of the perithecium; its extremity, only, free and somewhat divergent, hyaline or slightly involved by the olive brown suffusion of the rest of the appendage; which is distinguished by a deep blackish septum and is similar to the distal portion of the primary appendage, except that its base is three-celled; the two lower cells squarish, both suffused, the third nearly twice as long, the fourth usually bent slightly outward. Perithecium hyaline, or becoming slightly suffused near the tip, nearly straight, subsymmetrical, slightly enlarged below the rather abruptly distinguished hyaline relatively large apex, the broadly rounded slightly sulcate extremity of which is subtended on either side by a distinct prominence, the anterior somewhat lower. Spores, female, $30 \times 3.8\ \mu$, the apical segment very short. Perithecia $58-68 \times 22\ \mu$. Primary appendage $75-80 \times 8\ \mu$, its basal cell $15-21\ \mu$: free portion of first secondary appendage $54-56 \times 8.5\ \mu$. Total length to tip of perithecium $100-125\ \mu$.

On *Parasitus* sp. and *Macrocheles* sp. No. 2493, M. C. Z. (Mann. Collection). Orizaba, Mexico.

This well marked species is more nearly allied to Paoli's *D. mucronatus* and *D. muticus*, but is so clearly distinguished by its three celled primary appendage, as well as by numerous other characters that further comparison is unnecessary. The two appendages form the arms of a more or less symmetrical Y, in the angle of which the perithecium rests.

***Dimeromyces subuliferus* nov. sp.**

Male individual hyaline; the receptacle consisting of two very obliquely superposed cells, the upper slightly larger and corresponding to the subbasal cell, as well as to the subbasal cell of the terminal appendage, which is separated from it distally by a slight constriction and dark septum, and consists of two cells; the upper subulate, its extremity straight, recurved, or bent. Venter and small stalk-cell of the antheridium separated from the subbasal cell by a curved oblique septum, erect; the brown neck clearly defined, rather long and usually bent across the distal portion of the appendage. Total length to tip of antheridium, including foot, $50-55 \times 10 \mu$.

Female individual becoming suffused with blackish brown above, the basal cell of the receptacle hyaline, forming a more or less well defined stalk on which is borne the compact and somewhat rounded abruptly broader upper portion, which is composed of usually three-smaller somewhat obliquely superposed nearly median cells lying below the base of the single perithecium, which separate a corresponding number of obliquely superposed, closely united, externally prominent cells anteriorly, each bearing a single simple terminal portion; which is distinguished by a dark septum and constriction, is three celled, the two lower cells subequal stout and about as broad as long, the terminal one forming a slender prolongation which usually is recurved inward and lies against the surface of the receptacle; the remainder of the receptacle consisting of three very obliquely superposed larger cells lying on the opposite side of the perithecium, the *lower* of which is smaller and gives rise to the latter: the *middle* one longer and narrow, its upper two thirds or less united to the perithecium, its upper third or more separated by a septum, and terminated by a rigid subulate appendage which is two-celled, its basal cell partly hyaline or translucent, strongly inflated, distinguished below by a blackened septum and constriction, the upper portion tapering

to a slender blunt hyaline apex; below red brown, the suffusion becoming deeper with age and involving the basal cell also; its distal half lying above the apex of the perithecium; the *upper* cell subtriangular, terminating below the apex of the middle one, and bearing a single terminal primary appendage similar to those on the anterior side. Perithecium stout, subsymmetrical, erect or slightly tilted toward the anterior side, ovoid or broad-fusiform; the apex subtruncate, hyaline, subtended by a reddish brown suffusion which also involves the venter and eventually the whole perithecium and the adjacent portions of the receptacle. Perithecia $55-64 \times 25-30 \mu$. Spores about $30 \times 4 \mu$. Basal cell of receptacle $25-42 \mu$. Subulate appendage $38-42 \mu$. Total length to tip of perithecium $92-125 \times 42-50 \mu$.

On *Uropoda* sp. sensu latiore. No. 2692. Verdant Vale, Arima, Trinidad, B. W. I.

This species is at once distinguished from other known forms by its rigid, suffused, subulate subterminal appendage, as well as by the character of the other appendages and the position of their slender recurved terminations. In general appearance it closely resembles species of *Rickia* of compact form which occur on similar hosts.

***Dimeromyces adventitiosus* nov. sp.**

Male individual pale yellowish, the receptacle consisting of five or more cells; the basal larger, subtriangular, the rest flattened and somewhat oblique, producing single slightly divergent antheridia, or occasionally short scattered simple sterile branches. The appendage, an undifferentiated continuation of the axis, often bearing numerous antheridia on one or both sides; a large secondary appendage sometimes developed from the subbasal cell, of indefinite growth, and bearing numerous antheridia from the upper margin. Antheridia straight, or the necks slightly curved; the stalk-cell well distinguished, venter slightly inflated, neck moderately well distinguished. Length of receptacle proper about 25μ . Primary appendage 40μ or more, sometimes over 200μ , the large secondary appendages somewhat shorter. Antheridia about $22 \times 5 \mu$.

Female individual pale yellowish, the receptacle consisting of about six to eight flattened oblique cells; the primary appendage often greatly elongated, undifferentiated. Three or four of the cells of the receptacle usually producing simple, undifferentiated secondary

appendages; while from one or more of the remainder, perithecia may develop; adventitious perithecia may also arise from any cell of the primary or from those of the lower secondary appendages. Perithecia straight, somewhat asymmetrical, the stalk-portion short and not clearly defined, one margin more strongly convex; tapering distally to the short, nearly symmetrical, rather clearly differentiated, small, blunt apex. Perithecia $80-110 \times 20-18 \mu$. Receptacle and foot 40μ or less. Appendages variably elongated up to $425 \times 9 \mu$.

On the elytra and prothorax of *Tenebrio quadrihamatus* Fairm. No. 2801B, M. C. Z., Madagascar, (Wulsin).

This species is remarkable from its habit of producing adventitious perithecia and antheridia from primary and secondary appendages, as many as thirty-five of the latter being sometimes formed by a single individual, which may take on an irregularly furcate habit owing to the development of a large antheridiiferous branch from the subbasal cell. A majority of individuals, however, are more nearly of the normal type for the genus, although the primary appendage usually bears antheridia, like the undifferentiated axis below it. Both the primary and secondary appendages of the female are often greatly elongated and adventitious perithecia may appear even near their extremities. The species is most nearly allied to *D. anomalus*, but is very clearly distinct.

***Dimeromyces anomalus* nov. sp.**

Male individual pale yellowish; the axis rather slender, consisting of an indeterminate number of cells, slightly tapering, without differentiation of an appendage; the subbasal cell usually developing a secondary appendage which is similar to the main axis, and gives the individual a furcate habit; any cells of the axis, or the branch, producing antheridia of which there may be six more or less on the inner upper side. Antheridia rather stout, with short well defined stalk-cells, the necks rather short and stout, well distinguished, somewhat curved. Antheridia $20 \times 6 \mu$, longest axis 66μ .

Female individual pale yellowish, the subbasal cell giving rise to a secondary appendage which forms an axis similar to the main axis, and like it diverges at right angles to that of the basal cell; the two axes hardly distinguishable from one another, producing from the upper side near the base one or several perithecia and sterile branches: the cells of the axes and branches slightly longer than broad, the latter

hardly tapering. Perithecia usually not more than one to two or three in all, the stalk rather slender and well developed, rather clearly distinguished from the ascigerous portion; which is somewhat asymmetrical, slightly more convex on one side, the rather broad apex with one or both margins concave, subsymmetrical, or oblique when viewed sidewise. Perithecia $95 \times 15-16 \mu$; ascigerous part $47-52 \times 16 \mu$. The divergent axes $85-95 \times 6 \mu$.

On the left elytron of a small Tenebrionid. No. 3005, Florida, Solomon Islands (Mann).

I have hesitated to describe this very peculiar species owing to the scanty material, which is not in perfect condition, consisting of four males and five females, only two of which have mature perithecia. Its characters are so well marked, however, owing to the Y-shaped habit of the male and the T-shaped habit of the female, that it will probably be easily recognized. It is most nearly allied to *D. adventitosus*, also parasitic on a tenebrionid; but while in the males of the latter species the large secondary axis from the subbasal cell is apparently rare, all of the four individuals of the present species are thus developed. The production of adventitious perithecia and antheridia is far more restricted, the largest male examined bearing only six antheridia from both axes, the others less. The female of *D. adventitosus* has differently shaped, short-stalked perithecia, and no one of the several secondary appendages is specially developed as in *D. anomalus*, although it is only from one or two of the lowest that any formation of adventitious perithecia seems to take place.

Dimeromyces Peltoidis nov. sp.

Male individual hyaline, or becoming tinged with brown. Receptacle four- or five-celled, the basal larger, sometimes more or less involved by the blackening of the foot; terminal appendage two- or three-celled, rarely furcate, undifferentiated and not distinguished from the receptacle. Antheridia slightly divergent, usually two, sometimes four, rather short and stout, the necks short, blunt, not abruptly distinguished, slightly curved. Total length $40-46 \mu$. Antheridia $15-20 \times 4.5-5.5 \mu$.

Female individual pale yellowish, or becoming tinged with brown. Receptacle short and stout consisting of usually seven cells; the basal rather small, but longer; the rest flattened, subtriangular, in a curved series, each producing one, sometimes two, appendages or perithecia;

the terminal primary appendage, like the secondary, undistinguished, nearly uniform, rather closely septate, tapering slightly at the apex, often furcate above the basal cell which may also produce an adventitious perithecium or appendage: the successive cells of the appendages usually separated by slight constrictions at the septa, or somewhat broader at the ends. Perithecia usually elongate, subsymmetrical, the medium, blunt apex subtended by a slight general enlargement of the tip-region; the stalk undifferentiated, or sometimes rather abruptly distinguished, slender and curved. Spores $26 \times 2.5 \mu$, female. Perithecia including stalk $85-180 \times 14-22 \mu$. Longest appendages $100-190 \times 6-9 \mu$. Receptacle $38-46 \times 4.5-5.5 \mu$.

On *Peltoides pustulatus* Fairm., Kamerun, West Africa, No. 3082.

This species appears to vary considerably according to its position and luxuriance of growth. Individuals from the legs and tip of the abdomen are darker, more fasciculate with short-stalked perithecia. Those on the elytra and prothorax are simpler and smaller, the appendages usually simple and single. A specimen growing near the base of the posterior legs is much larger, with branched appendages and supernumerary perithecia. In the more compact and fasciculate types the structure of the receptacle is more or less completely concealed and the appendages form a dense tuft which appears to arise from a more or less common base.

Dimeromyces Strongylii nov. sp.

Male individual pale yellowish with a faint brownish tinge. Receptacle compact, slightly curved, erect; consisting of from five to ten flattened cells obliquely superposed; the basal cell subtriangular, usually flattened like the rest, which bear either antheridia or simple sterile tapering appendages of which seldom more than two, sometimes none, are present; the antheridia varying in number according to the number of cells, arising in a unilateral series, the successive members of which diverge slightly right and left; their axes, in general, coincident with that of the cell which bears them. Primary and secondary appendages undifferentiated, similar, tapering. Antheridia rather stout, straight, the necks relatively short. Receptacle $25-42 \times 16 \mu$. Antheridia $25-30 \times 9 \mu$. Appendages $40-80 \mu$.

Female individual pale yellowish, faintly tinged with brown. Receptacle, similar to that of the male, consisting of from eight to ten cells, bearing secondary appendages and perithecia, seldom more than three

of the latter. The primary appendage similar to the secondary, undifferentiated, tapering; the distal portion proliferous through a collar above the fifth or sixth cell. Axes of the appendages and perithecia coincident in general with those of the cells which bear them. Perithecia subfusiform, straight, subsymmetrical, the stalk not abruptly distinguished and about as long as the ascigerous portion; the termination blunt, rather broad, unmodified. Perithecia 75-120 \times 20-25 μ . Receptacle 40-60 \times 16-25 μ . Appendages longer 100-150 μ .

On the elytra and inferior surface of *Strongylium* sp. No. 2353, Kamerun, West Africa.

The species is more nearly allied to *D. Peltoidis* and *D. adventitosus*, from both of which it is, however, abundantly distinct. The appendages are rigid and often distally attenuated, the distal portion being usually distinguished by a collar formed through the disorganization of the outer walls, usually above the fifth or sixth cell, the lumen of this portion being very small.

Dimeromyces Amarygmi nov. sp.

Male individual hyaline or faintly yellowish, erect, rather slender; the receptacle consisting of about ten flattened cells, the upper three or four somewhat oblique; the terminal cell, and one to six or seven of the cells below it, giving rise to antheridia. Antheridia suberect, or but slightly divergent, the stalk-cells small and well defined; the neck nearly as long as the venter and rather strongly bent outward. Primary appendage simple, the distal portion slender, usually longer than the receptacle. Antheridia 25-30 \times 7-8 μ ; receptacle 45-55 \times 7-12 μ ; primary appendage 55-85 μ .

Female individual pale yellowish. Receptacle erect, or bent but slightly distally; consisting of from twelve to eighteen cells; the upper three or four oblique, the rest more flattened, all except the lowest usually giving rise to simple secondary appendages or perithecia. Appendages rather closely septate below, the upper longer and distally attenuated; one or more of the lower usually bent characteristically downward to the substratum: the primary appendage similar, but shorter than those below it. Perithecia one or several, straight, nearly symmetrical, increasing in diameter slightly and continuously from the insertion of the stalk to the tip-region; which is clearly distinguished by slight elevations on either side, whence it tapers

rather abruptly to the slightly inflated apex. Perithecia $125-235 \times 20-24 \mu$, the subconical extremity about 20μ . Longest appendages $150-275 \mu$. Receptacle $65-100 \times 20-25 \mu$.

On elytra of *Amarygmus* sp. No. 2333 and 2567, Kamerun, West Africa.

This species is very closely allied to *D. Strougylii* differing in the form of its perithecium and antheridia, its attenuated upper and down curved lower appendages, as well as in minor characters.

Dimeromyces Trycheri nov. sp.

Male individual pale yellowish. Receptacle rather stout, consisting of from five to eight cells, all except the basal and distal much flattened and more or less oblique. A single terminal appendage, straight, somewhat divergent, usually two-celled, about as long as the antheridia. Antheridia two to six; the venter stout, a slight enlargement below the neck, which is short and rather well distinguished: the stalk-cell short. Receptacle about $30 \times 12 \mu$. Appendage 30μ . Antheridia $25 \times 8 \mu$.

Female individual pale yellowish. Receptacle consisting of more often sixteen cells, the basal subtriangular, the rest usually much flattened, the distal ones slightly oblique, all bearing perithecia or appendages, except the lowest. Primary appendage short, two- or three-celled, the more slender terminal portion subtended by a more or less distinct brownish suffusion; the secondary ones tapering from a stout base, longer, the third cell brown, more or less clearly distinguishing the basal from the terminal part; the lower ones not thus modified, and often curved downward, or even across the foot. Perithecia straight, subsymmetrical, subfusiform; the stalk shorter than the ascigerous part, which is hardly distinguished from it; the slightly inflated tip-region distinguished below by a slight depression; the apex very slightly inflated, subsymmetrical, pointed. Perithecia $100-125 \times 25 \mu$. Receptacle $80-100 \times 25-30 \mu$. Primary appendage $30-40 \mu$; secondary appendages, longer $85-100 \times 9 \mu$.

On the elytra and legs of *Trycherus bimaculatus* Guer., and *Trycherus* sp. Metet, Kamerun, W. Africa, Nos. 2445, 3087 and 3088.

This species is closely allied to *D. Amarygmi*, but is at once distinguished from this and other allied forms by the brown modification of the third cell of a majority of the secondary appendages. The specimens occurring on the legs of the host are stouter and more compact, with shorter appendages.

Dimeromyces Cryptici nov. sp.

Male individual uniform pale yellowish, becoming faintly tinged with brown. Receptacle and appendage forming an undifferentiated axis somewhat divergent and tapering distally; the walls thick, the transverse septa horizontal, the lower cells but slightly flattened. Antheridia one to four, slightly divergent, the well developed stalk-cell bent abruptly upward, the venter short and stout, the hyaline neck straight, rather short, abruptly distinguished. Total length to tip of appendage $70 \times 9 \mu$. Antheridia $25 \times 8 \mu$.

Female individual like the male in general color and structure, slightly darker. Subbasal cell of receptacle giving rise to a stout slightly tapering secondary appendage, curved upward against the perithecium and reaching about to its middle. Perithecia one or several, the stalk short and bent upward, the rest subsymmetrically fusiform, the tip hardly distinguished, the apex small, short, hyaline, abruptly distinguished by a slight constriction on both sides, that on the inner subtended by a more or less well defined protrusion; slightly pointed distally with flat rounded lips on either side. Perithecia $75-84 \times 18-22 \mu$. Secondary appendage $75-90 \times 9 \mu$. Total length to tip of primary appendage $75-100 \times 9 \mu$, of perithecia $100-120 \mu$.

On the elytra of *Crypticus scriptipennis* Fairm., No. 3078, Kamerun, W. Africa.

This small species is distinguished by its undifferentiated primary appendage, which is a direct continuation of the receptacle as in *D. Thaxteri* Maire, as well as by the single secondary appendage which is similar to and about as large as the combined receptacle and primary appendage, though less tapering distally.

Dimeromyces Dhanyae nov. sp.

Male individual dull pale olivaceous brown throughout. Receptacle consisting of three very unequal and oblique cells, the basal extending upward anteriorly more than half its length: the appendage consisting of three cells, the two basal concolorous, the second minute, flat and horizontal, the terminal cell contrasting in form and color, reddish brown, twice as long as broad, slightly constricted below a terminal knob-like bluntly apiculate termination (cell?). Antheridium appressed, the venter short, erect, the neck large, irregularly bent in two directions, with a prominence on the inner side, distally

pointed. Total length to tip of appendage, including foot, 65-70 μ . Terminal cell of appendage 11-13 \times 5.7 μ . Antheridium about 44 \times 13 μ .

Female individual compact, partly suffused with blackish brown. Receptacle consisting of usually four cells very obliquely superposed and somewhat irregular: the basal extending upward posteriorly more than half its length, bulging distally above an external blackish brown suffusion, the subbasal small and narrow, nearly vertical, bearing a two-celled, deeply suffused, short, broad appendage, the narrowed extremity of which is bent abruptly inward ending in a hyaline papilla: the fourth cell bearing a rather short curved hyaline cylindrical unicellular appendage; the primary appendage consisting of a subtriangular subtending basal cell and two free cells; the lower small, flattened, concolorous; the upper similar to that of the male, deep reddish brown and ending in a darker knob-like apiculate termination subtended by a dark transverse line (possibly a septum?). Perithecium erect, the stalk opaque except its hyaline base, rather abruptly and clearly distinguished from the ascigerous portion; which is strongly inflated, somewhat more convex on the inner side, opaque or deeply suffused below, transversely mottled above and translucent; the distal half subconical; the termination somewhat oblique, subtended by deeper suffusions, one of the lips on one side hyaline and slightly projecting. Perithecium, stalk-portion 48-58 \times 20-22 μ : ascigerous portion 75 \times 38-42 μ . Receptacle 48 \times 38 μ . Terminal cell of primary appendage 15 \times 7.5 μ : upper secondary appendage 38-50 \times 6 μ : lower 28 \times 19 μ . Total length to tip of perithecium 190 μ .

On the inferior tip of abdomen of *Dhanya* sp. Mindanao, P. I. No. 2389 (Webber Coll.)

I am indebted to Professor Oakes Ames for the host of this very peculiar and interesting form, which is so unlike any other thus far known that it cannot be mistaken. In the general form and coloration of its perithecium it bears a most remarkable resemblance to *Cucujomyces Diplocoeli* and *C. curtipes*. Both secondary appendages are anomalous, especially the lower which might be mistaken for a suffused compound antheridium. The knob-like termination of the primary appendage may prove in both sexes to be a minute cell.

***Dimeromyces Amazonicus* nov. sp.**

Male individual hyaline, slender, erect, the receptacle consisting of three cells obliquely superposed; the basal longer; the width nearly

uniform. Terminal appendage three-celled, the basal somewhat broader, the distal pointed, all of about equal length. Antheridium long and rather slender, erect, the stalk-cell relatively long and free, the neck nearly as long as the venter, diverging or slightly curved outward, its apex extending some distance above the tip of the appendage. Total length to tip of antheridium $42 \times 8 \mu$. Antheridia $24 \times 9 \mu$. Appendage $14 \times 3 \mu$.

Female individual hyaline, erect, slightly curved: the receptacle consisting of four cells very obliquely superposed; the basal longer and extending upward almost as far as the two succeeding ones, the subbasal bearing the single secondary appendage, close to the base of which the third cuts off a small cell; the fourth less flattened, narrower and longer, bearing the single perithecium. Primary appendage consisting of two large cells of uniform width, the upper longer; the rest of the appendage abruptly narrower and faintly brownish at the base, slightly tapering and rather elongate. The secondary appendage elongate, consisting of a large nearly free basal cell, above which a faintly brownish narrower basal portion is distinguishably elongated and tapering, the walls of the cells tending to disorganize. Perithecium sessile, or very short-stalked, slightly curved, its inner margin rather strongly convex; the apex somewhat sulcate, distinguished by a rather abrupt constriction from the tip-region. Perithecia $60-75 \times 14 \mu$. Longer appendages secondary, $114-130 \times 4 \mu$ (basal part) primary appendage $75-100 \times 3.5 \mu$ above basal cells, the latter $24 \times 6 \mu$. Receptacle $28 \times 15 \mu$. Total length to tip of perithecium $75-100 \mu$.

On the elytra of *Platydemia* sp.? No. 2243, Independencia, Amazon, (Mann Coll.).

This species is clearly distinguished by its peculiar appendages and the abruptly differentiated apex of its perithecium, the large lip-cells in some individuals separate and irregularly divergent.

***Dimeromyces Heterophylli* nov. sp.**

Male individual tinged with pale brownish yellow. Receptacle consisting of four cells, the basal much longer, the rest somewhat flattened and obliquely superposed. Appendage consisting of a large free basal cell prominent distally and externally; the rest of the appendage usually three-celled, abruptly narrower, its basal cell brownish,

the whole converging more or less conspicuously inward from the oblique distal surface of the basal cell. The antheridia short and stout, almost sessile, with short necks strongly curved outward. Receptacle and foot 30–35 μ . Appendage 20 μ . Antheridia 18 \times 7.5 μ .

Female individual tinged with pale brownish yellow. Receptacle consisting of usually six cells, somewhat flattened and oblique, except the longer irregularly triangular basal cell. Secondary appendage usually single and arising from the third or fourth cell, usually somewhat divergent. Primary appendage similar to that of the male, less conspicuously bent toward the perithecium, consisting of six or seven cells, the subbasal slightly brownish and abruptly distinguished from the much larger broader basal cell which bulges more or less conspicuously below it externally. Perithecium short-stalked, subsigmoid; its rather broad termination slightly bent upward, blunt, unmodified, sometimes slightly oblique. Perithecia 45–48 \times 14–15 μ . Receptacle 38–44 \times 12 μ . Secondary appendage, longest 65 μ : primary 28–35 μ . Total length to tip of perithecium 75–80 μ .

On the elytra of a bluish black immaculate species of *Heterophyllus*, Hayti, No. 2760 (Mann Coll).

This species is closely allied to *D. proximus*, but appears to differ in the characters of both sexes to which reference is made under that species.

***Dimeromyces proximus* nov. sp.**

Male individual hyaline or faintly tinged with brownish yellow. Receptacle erect consisting of four cells; the basal narrower and somewhat longer; the rest subequal, slightly flattened and oblique. The appendage usually four celled, the basal much larger, the subbasal abruptly narrower and brownish, suberect and hardly reaching the tip of the upper antheridium. The latter relatively long and slender, one to three in number, the stalk-cell well defined, the venter slightly inflated, the neck slightly curved outward. Receptacle 28 μ . Antheridia 28 \times 6 μ . Appendage 20–24 μ . Total length to tip of antheridia 58 μ .

Female individual faintly tinged with pale brownish yellow, erect, compact. Receptacle consisting of six or seven cells somewhat obliquely superposed and somewhat flattened; the basal subtriangular, short; the two above it, rarely a third, producing secondary appendages which are appressed, bending upward against the peri-

thecium, the apex of which they seldom reach, rather stout, hardly tapering, six or seven celled; the primary appendage similar to that of the male, usually five celled; the subbasal abruptly narrower and slightly brownish; the distal as long as the rest of the appendage, or nearly so. Perithecium usually single, erect, straight or nearly so, stout, sessile, the tip tapering to the apex which is slightly bent side-wise toward a terminal pair of minute auricle-like projections. Perithecia $38-50 \times 12-14 \mu$. Receptacle $30-38 \mu$. Primary appendage $28-38 \mu$; secondary $45-60 \mu$. Total length to tip of perithecium $75-100 \mu$.

. On the elytra of a smaller species of *Heterophyllus* with an orange spot on the elytra. No. 2759 Hayti (Mann).

This species is so closely allied to the preceding that I have hesitated to separate them. Since both male and female show distinct differences, however, I have concluded to do so provisionally, at least. The perithecium of the present form not only bears the two terminal projections lacking in *D. Heterophylli*, but is differently shaped, erect and almost symmetrical; while in the latter the apex, which is turned slightly upward, has no such appendages, the inner margin of the perithecium being strongly convex, while the outer is straight or concave. In the male the primary appendage is not bent conspicuously inward, as in *Heterophylli*, which has shorter, relatively stouter, almost sessile antheridia, with shorter more strongly curved necks.

***Dimeromyces Derispiae* nov. sp.**

Male individual pale yellowish. Receptacle consisting of from five to seven cells, the basal larger, the rest somewhat oblique and flattened, the distal less so; the primary appendage slightly bent inward, its basal cell somewhat larger, its distal half subcylindrical with a blunt termination. Antheridia from two to four superposed, arising from the four upper cells; slightly divergent, the stalk-cell minute, the neck well distinguished, short, stout, curved, slightly outward. Receptacle $55-59 \times 12.5 \mu$. Appendage $34-42 \mu$. Antheridia $25-29 \times 9-12.5 \mu$. Total length to tip of appendage including small pointed foot, $80-92 \mu$. Appendage $34-42$.

Female individual yellow, becoming slightly tinged with brown, straight, erect. Receptacle with small pointed foot; consisting of about twelve to sixteen cells, short and much flattened above the basal one, not at all oblique, becoming gradually broader and some-

what rounded above, their posterior margins rather strongly convex; all but the lowest separating a small cell distally and externally. The subterminal cell, also rarely the second cell below it, giving rise to an outcurved secondary appendage, about seven to ten-celled, tapering more or less, slightly shorter than the similar, six to nine-celled, erect, tapering primary appendage. Perithecium erect, nearly symmetrical, subfusiform, sessile, relatively short; the tip relatively long, well distinguished, more convex anteriorly; the apex short, rounded. Perithecia 105-22 μ . Receptacle 125-170 \times 25 μ . Primary appendage 90-125 \times 12 μ ; secondary 80-95 μ . Total length to tip of perithecium 210-275 μ .

On the left elytron of *Derispia moquercysi* Pic. No. 2568, Kamerun, West Africa.

In general habit this species recalls *D. nanomasculus*, although the perithecia and appendages are quite different and are produced from one side only. Rarely in the present species, a second perithecium and appendage may arise from the cells immediately below those normally present.

***Dimeromyces luteus* nov. sp.**

Male individual pale yellowish, slender; the receptacle consisting of three obliquely superposed cells, the basal long and slender, the others subequal, one or both producing antheridia. Appendage of three or four cells, the basal larger rather clearly distinguished from the slightly brownish narrower cells above. Antheridia relatively long and slender, the stalk-cell well defined, curved inward, the upper one in contact more or less continuously with the appendage, extending nearly to its tip, the necks usually strongly curved inward. Receptacle 55-65 \times 12.5 μ . Appendage 40-45 μ . Antheridia 46-50 \times 9 μ . Total length 95-100 \times 14 μ .

Female individual clear pale yellow, becoming somewhat suffused with brown, erect. Receptacle consisting of four cells; the basal somewhat elongate, the second and third oblique and somewhat flattened; producing normally one perithecium from the third and one secondary appendage from the second. Primary appendage shorter than the perithecium and erect beside it, or rarely slightly divergent; the basal cell much larger, long, and broader than the subbasal; which is clearly distinguished by its brown color. Secondary appendage seldom as long as the perithecium, and lying close

against it; the basal cell longer, the following six or more squarish, the subdistal ones broader, the lowest tinged with brown. Perithecium becoming tinged with brown, straight, erect, rather stout, sessile, subsymmetrical; the tip- and apex-regions abruptly distinguished, tapering to a rather broad bluntly rounded termination. Perithecia $90-100 \times 24-30 \mu$. Receptacle $60-65 \times 20 \mu$. Longest appendages $75-100 \mu$. Total length to tip of perithecium $140-160 \mu$.

On the elytra of *Leiochrodes medianus* Westw. and *Leiochrodes* sp. No. 2950, 2951, 2996 and 2997, Auki, Solomon Is. (Mann Coll.).

In the group of forms occurring on species of *Leiochrodes* this species is easily distinguished by its very different color, sessile perithecium of a different form and lying between the two erect appendages which are usually in close contact with it and appear to hold it as in a socket. The male differs from that of the others in its long slender form, incurved necks and pale yellowish color. It occurs scattered over the elytra, sometimes in company with *D. rugosus*.

***Dimeromyces rugosus* nov. sp.**

Male individual rather dark brown. Receptacle four-celled, the cells irregular, somewhat obliquely superposed, the basal longer. Appendage erect, three to four-celled, the basal much larger and broader. Antheridia one or rarely two, the stalk-cell well developed, often longer than broad, the venter rather stout, erect beside the appendage, the neck curved abruptly sidewise, or even recurved. Total length $75-92 \times 17-21 \mu$. Antheridia $42-50 \times 11-12.5 \mu$. Appendage 40μ .

Female individual becoming rather dark brown, or partly opaque. Receptacle relatively small, four-celled, the cells obliquely superposed, the basal somewhat longer; the two others flattened and subequal; the subbasal producing the single secondary appendage; which is stout, five to nine-celled, distally usually somewhat broader, the third and fourth cells usually broader than long, the basal long and narrower; the third and sometimes the fourth cells producing perithecia; the primary appendage shorter than the secondary, which may reach to the middle of the perithecium, consisting of usually four cells, the second and third shorter and becoming darker brown. Perithecium relatively large, becoming nearly opaque above the hyaline base, long, straight, subsymmetrical, rather slender, becoming very dark and finely transversely rugose, the tip well distinguished, relatively

short, tapering to the hyaline apex which usually appears as a shallow cup, or sometimes blunt and irregularly oblique. Perithecia $125-200 \times 26-30 \mu$. Receptacle $42-64 \times 35-45 \mu$. Primary appendage $60-80 \mu$, secondary $100-160 \times 16 \mu$. Total length to tip of perithecia $125-200 \mu$.

On the elytra of *Leiochrodes medianus* Westw. Nos. 2998 and 2951, Auki, Solomon Islands (Mann Coll.). *Leiochrodes minutus* Pic, No. 1836, Sarawak, Borneo.

This species is well distinguished by its finely rugose perithecial wall, the granularity forming transverse lines which are hardly visible as the mature perithecium becomes nearly opaque. The apex usually appears flat and hyaline with a slight elevation symmetrically placed on either side, giving the effect of a shallow cup. This form is not always apparent, however, probably owing to a slight turn of the perithecium. The brown suffusion of different individuals varies considerably and the receptacle may be either translucent or opaque.

***Dimeromyces longicollis* nov. sp.**

Male individual more or less uniformly tinged with yellowish brown, erect. Receptacle three-celled, the cells somewhat obliquely superposed, the basal longer. Appendage erect, consisting of four cells, the three lower subequal, the subbasal becoming rich deep brown; the terminal one somewhat longer, slightly tapering. Antheridia one or two, relatively large and long, the stalk well developed, the slender long necks bent slightly inward, and reaching far above the tip of the appendage. Receptacle $50 \times 17 \mu$. Appendage $50-60 \times 7 \mu$. Antheridia $85 \times 14 \mu$, the necks $42 \times 3 \mu$. Total length about $140 \times 18 \mu$.

Female individual tinged with yellowish brown, the perithecium becoming rich dark brown. Receptacle consisting of four cells; the two middle ones flattened and obliquely superposed. Primary appendage consisting of five or six cells, the basal slightly longer and broader, the subbasal small and distinguished by constrictions and dark septa. Secondary appendage consisting of six or more cells, somewhat longer, extending a short distance above the stalk-portion of the perithecium. Perithecium long and slender, erect, blackish brown; the stalk portion pale, and distinctly indicated; the distal portion curved inward; the short hyaline, slightly oblique apex turned outward. Perithecia $250 \times 30 \mu$. Receptacle $64 \times 22 \mu$. Primary

appendage $64-84 \times 12 \mu$; secondary $100-120 \times 12 \mu$. Total length $275-310 \mu$.

On the elytra of *Leiochrodes medianus* Westw. Nos. 2951 and 2997, Auki, Solomon Islands. No. 2998 Fulakora, Solomons (Mann Collection).

This species is closely related to *D. decumbens*, but differs very clearly in the form of its perithecium and the length and character of its appendages, as well as in the great elongation of the neck of the antheridium in the male. One pair shows a maculation of the basal cell in both sexes, similar to that seen in *D. decumbens*, but there is no indication of it in the other individuals.

***Dimeromyces decumbens* nov. sp.**

Male individual dull brown, straight, the receptacle consisting of three cells, the basal transversely rather coarsely punctate, the distal end free from maculation. Appendage erect, four celled, the two middle cells squarish and deeply suffused or opaque. Antheridium single, erect, in contact with the appendage, the stalk well developed, the neck clearly distinguished and bent sidewise distally. Receptacle $50-60 \mu$. Appendage 38μ . Antheridia $80 \times 18 \mu$. Total length 125μ .

Female individual more or less uniform dull brown. Receptacle consisting of four cells obliquely superposed, the anterior face of the basal maculate as in the male. Primary appendage short, four-celled, the terminal cell hyaline, emerging from a cup-like base formed by the partial disorganization of the blackish wall below; the three other cells small, subequal; the subbasal nearly opaque, the others brown. Secondary appendage single, arising from the subbasal cell, very large, subsigmoid: consisting of six or seven cells, the basal long, stout, and curved; the rest successively shorter; the terminal one tapering to a blunt end. Perithecium darker dull brown, somewhat more so above the paler, rather short stalk-portion which curves upward at an angle, even at right angles, to the prostrate receptacle: the body of the perithecium elongate, slender, asymmetrical; the distal portion slightly bent outward, the tip-region distinguished by slight elevations; the coarse blunt apex bent slightly inward, snout-like. Perithecium $235-310 \times 38-42 \mu$; the stalk-portion $60-80 \mu$. Receptacle $70 \times 34 \mu$. Primary appendage $45-60 \times 12-14 \mu$; secondary $250-290 \times 20-22 \mu$. Total length to tip of perithecium $365-380 \mu$.

At the base of the posterior legs of *Leiochrodes* sp., Auki, Solomon Islands (Mann Coll.).

The receptacle and the male individual appear to lie flat in the host, the secondary appendage and the perithecium projecting upward at a variable angle, the axis of the primary appendage coinciding with that of the receptacle. A very large species clearly distinguished from its allies on hosts of the same genus.

***Dimeromyces sulcatus* nov. sp.**

Male individual hyaline, erect; the receptacle consisting of three very obliquely superposed cells, the basal extending up beside the subbasal nearly to its upper margin. Appendage erect, subcylindrical, of five or six cells, considerably longer than the receptacle, relatively stout. Antheridia one or two, suberect, the stalk-cell slender and well developed, the body rather long and narrow, the neck clearly defined and bent abruptly at right angles backward or sidewise. Receptacle $25 \times 8 \mu$, exclusive of the small pointed foot. Antheridia, to bend of neck, $34 \times 5-6 \mu$. Appendage $38-45 \times 4.5 \mu$.

Female individual almost perfectly hyaline, erect, the receptacle consisting of four cells, the protoplasmic region of the basal similar to that of the two cells above, the three lying very obliquely, and much flattened; the primary appendage subcylindrical, four- or five-celled, erect; the secondary appendage single, arising from the subbasal cell, seven or eight celled, erect and close beside the perithecium; the upper third of which is curved outward beyond its apex. Perithecium straight, except for the distal curvature which is subtended on the inner margin by a slight protuberance, long and slender, the tip slightly inflated and distinguished above and below by prominent constrictions; the apex deeply sulcate, almost as long as the tip, the margins convex. Perithecia $90-105 \times 12-15 \mu$. Primary appendage $40-45 \times 5 \mu$. Secondary $65-75 \times 5 \mu$. Receptacle $30-34 \times 12 \mu$. Total length to tip of perithecium $120-148 \mu$.

On the elytra of *Leiochrodes* sp. Los Baños, Luzon, P. I. No. 3043 (W. H. Weston).

This small and almost perfectly hyaline form is more nearly related to *D. luteus* and its allies which occur on similar hosts and is most easily distinguished by the peculiar conformation of the curved termination of its perithecium, and its sulcate apex.

Dimeromyces appendiculatus nov. sp.

Male individual faintly tinged with yellowish. Receptacle short and broad, foot large; basal cell flattened, extending upward on the anterior side above the base of the stalk-cell of the lower of the two antheridia; which arise from the distal and subbasal cells: that from the latter, with long stalk-cell, which bears it higher than the upper curved backward or sidewise, almost at right angles. Appendage long, slender and about five-celled above the large basal cell. Receptacle $19 \times 20 \mu$. Antheridia, upper 35μ , lower 45μ . Appendage, longest examined, 45μ . Total length to tip of lower antheridium including foot 60μ .

Female individual pale yellowish. Receptacle as in the male, but four-celled, the lower cells becoming somewhat distorted and misplaced, the basal also forming a narrow margin which extends up to the end of the basal cell of the secondary appendage to which it is adherent. Both appendages similar, slender, tapering slightly. Perithecium relatively very large, sessile, larger at the base, tapering gradually, bent or curved inward or arcuate; the tip somewhat narrower and well distinguished; the apex subtended by a slight indentation bearing a short tooth-like projection on one side and a long slender usually upcurved distally clavate appendage on the other. Perithecia $115-150 \times 14-17 \mu$, its appendage $40-50 \times 7.5 \mu$ at tip. Receptacle $15 \times 22 \mu$ (exclusive of large foot). Appendages longest, 95μ . Total length to tip of perithecium $135-170 \mu$.

On the antennae of *Leiochrodes medianus* Westw. and *Leiochrodes* sp., Nos. 2996-98, Auki and Fulakora, Solomon Islands (Mann Coll.).

The very peculiar receptacle and perithecial appendage clearly distinguish this species. The cells of the former become so displaced by growth that it is usually almost impossible to determine their limits. The extension upward of the anterior edge of the basal cell to form a margin gives the receptacle a characteristic appearance.

Dimeromyces rigidus nov. sp.

Male individual yellowish, becoming dark brown. Receptacle consisting of from five to seven cells, those above the basal oblique and much flattened, especially below, both margins convex; the basal cell of the primary appendage rather abruptly narrower, and like the

secondary distinguished from the rather short, slightly tapering two- to three-celled terminal portion by a thick black septum. Antheridia one to several, associated with stiff erect brown secondary appendages: long and slender, with well developed slender stalks, the neck relatively long, slender, straight, or somewhat curved. Receptacle, exclusive of large foot $30-40 \times 10.5-14 \mu$. Primary appendage 30μ , secondary, larger $50 \times 5 \mu$, distinguished above the basal cell by a black septum. Antheridia $50 \times 6.5 \mu$.

Female individual becoming more or less suffused with dark brown. Receptacle straight, or but slightly curved, consisting of usually six cells, the basal paler, short and subtriangular; the rest more or less compressed and oblique, the subterminal normally giving rise to the usually single perithecium; the rest, except the subbasal, producing secondary appendages; the broadened basal cells of which bear from two to usually four erect, stout, rigid deep reddish brown branches distinguished by broad black constricted basal septa: the basal cell of the shorter and more slender primary appendage pale and slightly inflated, often turned inward, very abruptly distinguished from the rest of the appendage. Perithecium relatively large, bent abruptly upward at its insertion, the stalk-portion long and stout, straight or distally somewhat curved, pale, rather clearly distinguished from the darker purplish brown ascigerous portion; the tip tapering, pale, abruptly distinguished by subtending elevations on both sides, the inner margin more convex; the apex abruptly distinguished, distally compressed; its abruptly broader base forming a conspicuous prominence on the inner margin, and a lesser one somewhat higher on the outer; the termination much compressed; the lips small, the inner bulging and slightly prominent; but when turned at right angles the apex appears spatulate or ligulate, flat and distally broadly rounded. Perithecia $275-355 \times 25-30 \mu$. Receptacle, without foot, $65-75 \times 25 \mu$. Appendages $150 \times 8 \mu$ or longer. Total length to tip of perithecium $390-425 \mu$.

On the inferior abdomen of *Aulacophora* sp. No. 2948, Auki, Solomon Is. (Mann Coll.)

This large species is well distinguished by its dark color, the form of its perithecium, its brown rigid appendages arising in transversely arranged groups and also by the characters of the male. The appendages are for the most part broken distally and may be longer than indicated, but do not appear considerably to exceed one third the length of the perithecium. It is most nearly related to some of the variations of *D. Aulacophorae* of which it may prove to be a variety.

Dimeromyces nigricaulis nov. sp.

Male individual subhyaline; the receptacle consisting of two or three cells; erect, of almost uniform diameter, the septa hardly oblique, the subbasal bearing the antheridium, a second sometimes arising from the basal cell of the appendage; which is not distinguished from the receptacle, and is separated from the short one or two celled abruptly narrower distal portion by a thick black constricted septum. Antheridium erect, curved outward distally, the stalk-cell well developed and conspicuously blackened distally; the outcurved neck relatively rather stout and short. Receptacle including basal cell of appendage and exclusive of foot $25 \times 4.5 \mu$. Antheridia $25 \times 7.5 \mu$. Free appendage above black septum $12 \times 4 \mu$.

Female individual uniform dirty pale yellowish brown, the receptacle somewhat darker. Receptacle consisting of usually six subequal cells, the four middle ones somewhat flattened and oblique, the subterminal one producing the usually single perithecium; the rest, except the basal, giving rise to appendages the basal cells of which each produce two branches transversely but somewhat irregularly paired, rather short, stout, and divergent from the base of the perithecium, distinguished by thick black constricted septa: the basal cell of the primary appendage hardly longer than broad, the free appendage short, few- or even one-celled, a secondary basal cell normally separated obliquely on the inner side and bearing a usually four-celled free appendage separated by a similar black septum. Perithecia as a rule slightly and evenly arcuate throughout, abruptly bent outward from the insertion, stout, very slightly broader distally, the stalk-portion not distinguished, the tip clearly differentiated by slight subtending elevations, associated with a slightly deeper suffusion of this region, the inner margin more convex, somewhat abruptly narrower and slightly tapering to the short apex, which is distinguished only by the prominently rounded inner lip-cell. Perithecia $200-235 \times 20-22 \mu$. Receptacle $70-85 \times 22 \mu$. Appendages $40-60 \times 8-8.5 \mu$. Total length to tip of perithecium 300μ , more or less.

On the elytra of *Diacantha flavescens* Ws. No. 3069, Kamerun, W. Africa.

Apart from other characters which might be variable, this species seems distinguished by the blackened termination of the stalk-cell of the antheridium, which is present and characteristic in the three individuals examined. A dozen females are available which show no

essential variations from the type described; but more abundant material would no doubt show deviations in form or size. It is undoubtedly most nearly related to *D. Aulacophorac*, from which the female differs in the form of its perithecium and its uniform short transversely paired branches.

DIMEROMYCES AULACOPHORAE Thaxter.

The original material of this species growing on *Aulacophora postica* from the Straits Settlements, which, though sufficiently abundant, was not in very good condition, has been supplemented by specimens from the Solomon and Fiji Islands, Madagascar and Africa on species of *Aulacophora*, *Platyxantha*, *Monolepta* and *Hyperacantha*. The material is abundant and in the best condition, and illustrates the very considerable range of variation in this type. The male is almost always, though not invariably, distinguished by the presence of secondary appendages: more often one, subtending the antheridium, if it is single; or, if there are several, two or three such appendages may be associated with them in various positions. The variations of the female are associated more particularly with the secondary appendages, their number, position and association, and in the development of the basal cell of the primary appendage which is usually relatively large and often much elongated, and may even be curved or recurved. In a majority of individuals, the secondary appendages are shorter and stouter than in the type, and tend to diverge or recurve from the base of the perithecium. They may arise from only one, or from three of the cells below the perithecium, and may be quite simple or less frequently, as in the type, be multiplied by proliferation from the left side of the basal cell, which may thus appear to bear two or three appendages, each distinguished by a basal blackened septum. The appendage above the perithecium may be similarly modified, and even the basal cell of the primary appendage may occasionally produce a subterminal adventitious branch. The apex of the perithecium, when viewed sidewise, is asymmetrical, and somewhat compressed; but, if viewed at right angles to this position, appears symmetrical, more or less trilobed, the middle lobe more prominent and much broader. The perithecium as a whole is variably developed, straight or sometimes falcate, the distal portion characteristically tinged with reddish brown.

Dimeryomyces geminandrus nov. sp.

Male individual hyaline to yellowish, sometimes with a slight brown tinge. Receptacle slender, erect; consisting of from two to six cells: the basal long, the rest somewhat flattened and obliquely superposed; basal cell of primary appendage long, symmetrical, of nearly uniform diameter, separated from the slender usually three-celled free appendage by a broad black constricted septum. Antheridia two to a dozen or more, often adventitious, even from the basal cell of the primary appendage which is usually enclosed by the venters of two paired antheridia which arise symmetrically and subterminally from the terminal cell of the receptacle, the necks curved outward in opposite directions: the rest formed in an often irregular series from the cells below, on the anterior side, sometimes associated with a secondary appendage from the basal cell of which one or more adventitious antheridia may also develop. Antheridia long and slender, the long stalk-cell abruptly erect or but slightly divergent, the neck curved outward. Receptacle, exclusive of foot and basal cell of appendage, $40-80 \times 8-12 \mu$. Free primary appendage $40 \times 4 \mu$, the basal cell $18-20 \times 6 \mu$. Total length to tips of highest antheridia $80-150 \mu$.

Female individual very variable in size, usually distinctly yellow or with variable brown suffusions. Receptacle rather short, consisting of from six to eight somewhat flattened obliquely superposed cells, the upper becoming tinged with brown: the subterminal giving rise to the usually single perithecium, below which two to four cells, as well as the terminal one, give rise to secondary appendages; the latter single and simple, or their basal cells producing two to four branches distinguished by very thick black constricted septa, hyaline, slender, flexuous, often very greatly elongated. Basal cell of the primary appendage usually producing one, sometimes more, adventitious branches similar to the other secondary appendages, on the inner side. Perithecium normally single, rarely two or three, very variable, often of great size, sometimes sessile with a broad base, more often with the stalk-portion much elongated, pale yellowish, distally undistinguished from the purplish brown ascigerous region; the tip usually well distinguished by slight elevations and tapering symmetrically to the clearly defined apex, which, in face view, is more or less broadly spreading, symmetrically rounded with submarginal indentations; the side view asymmetrical, compressed, blunt, usually with a slight subterminal enlargement. Perithecia $150-925 \times 20-34 \mu$. Receptacle $70-125 \times 20-40 \mu$. Longest appendage seen, $715 \times 5 \mu$.

On the elytra and inferior abdomen, the larger at the tips of the elytra, of *Hyperacantha Kolbei* Ws. No. 3072; and *Diacantha Deussenii*, Kamerun, West Africa.

Although this common species varies enormously in size its growth being apparently influenced by its position on the host, it does not vary essentially in fundamental characters. It is distinguished from the nearly allied *D. Aulacophorae* by the absence of any peculiar modification of the basal cell of the primary appendage, the extraordinary development of its perithecia, its fundamentally yellow color, and very slender and elongate appendages. The male is almost always readily distinguished by the presence of symmetrically paired antheridia arising from the distal cell on either side of the basal cell of the appendage which they enclose in a characteristic fashion.

***Dimeromyces auriculatus* nov. sp.**

Male individual almost hyaline. Receptacle erect, consisting of three cells, the two upper bearing superposed antheridia; the basal cell of the appendage slightly longer than broad, separated from the more slender free appendage by a black constricted septum. Antheridia slender with long stalk-cells, hyaline, the efferent region purplish; the neck hyaline, rather stout; the whole slightly curved outward throughout. Receptacle, exclusive of foot and base of appendage, $20 \times 8 \mu$. Basal cell of appendage $8.5 \times 4.5 \mu$. Antheridia $38 \times 6 \mu$.

Female individual rather short and stout. Receptacle erect, subtriangular, consisting of five cells; the three middle ones similar, flattened, oblique and somewhat curved; the subterminal bearing the single perithecium; the second, third and fifth, secondary appendages; the latter rarely double, separated by a large black constricted septum, stout, hardly reaching above the middle of the perithecium from the base of which they may curve outward, especially those from the terminal cell: basal cell of the primary appendage, relatively small, bell-shaped, producing a single terminal free appendage separated by a black septum and constriction. Perithecia relatively short and stout, yellow and abruptly narrower above the insertion, slightly asymmetrical, somewhat straighter on the inner side, subfusiform, brownish yellow; the stalk- and tip-regions not abruptly distinguished, the former tapering rapidly to the abruptly distinguished hyaline apex, which is usually symmetrical, a distal rounded protruding termination subtended on either side by similar ear-like appendages. Peri-

thecia $135-170 \times 29-34 \mu$. Receptacle $42-55 \times 22-25 \mu$. Longer appendages $85 \times 8 \mu$. Total length to tip of perithecium $190-230 \mu$.

On the mid distal surface of the right elytron of *Diacantha Deussenii* Karsch, No. 3073; Kamerun, W. Africa.

* This species is represented by only seven males and an equal number of females; but although it is related rather closely to the other species on this type of host, it seems well distinguished by the form of the perithecia, and the prominent and characteristic auricles which characterize the apex. Its comparatively short and stout appendages recall those of *D. Aulacophorae*, but are quite unlike those of *D. geminandrus* which occurs on the same host.

Dimeromyces helicoideus nov. sp.

Male individual erect, straight, or slightly curved. Receptacle hyaline, becoming slightly yellowish, its two cells of uniform diameter, the basal cell of the appendage narrower distally, separated from the free two- to three-celled appendage by a black constricted septum. Antheridia normally solitary, pale purplish brown, except the hyaline outcurved termination of the neck; the stalk well developed; erect, appressed or but slightly divergent. Receptacle, exclusive of foot, $34 \times 8 \mu$. Appendage, above black septum, $25 \times 5 \mu$. Antheridia $38 \times 6 \mu$.

Female individual. Receptacle hyaline becoming suffused with brown except at the base; consisting of normally five cells; the three middle ones somewhat flattened and oblique, the fourth producing the normally single perithecium, the second, third and fifth normally single secondary appendages, the lowest rarely double. Primary appendage shorter but similar to the secondary which are long, slender and tapering, distinguished above the basal cell by a black septum. Perithecium strongly curved or recurved so that the tip may touch the foot; the stalk-portion well developed but usually not distinguished, pale yellowish, merging into the rich dark purplish red-brown of the ascigerous portion: tip usually not distinguished; the apex subhyaline, short, blunt, unmodified. Perithecia $85-100 \times 18 \mu$. Receptacle $42 \times 12.5 \mu$. Appendages $50-170 \mu$.

Near the margin of the right elytron of *Crepidodera* sp. Nos. 3061, 3057 and 3074. Metet. Kamerun, W. Africa.

The strongly curved or helicoid habit of this species is very characteristic. It is much smaller than a majority of the forms on related

hosts, and has only been seen in the position indicated; except that in one instance a few smaller more nearly straight individuals were found on the posterior right leg.

Dimeromyces Hyperacanthae nov. sp.

Male individual subhyaline to faintly brownish, relatively small, the foot large. Receptacle consisting of three cells, one or both of the distal bearing antheridia; which are slender, erect, somewhat flaccid, the neck slightly curved, relatively long; the appendage erect, distinguished from its basal cell by a broad black constricted septum. Receptacle $30 \times 12 \mu$, exclusive of foot which is $16-18 \mu$. Appendage with basal cell 42μ . Antheridia $42 \times 5.5 \mu$.

Female individual uniform rather dark translucent reddish brown; erect. Receptacle consisting of normally five cells, the basal larger, the rest slightly flattened and oblique, a single perithecium usually arising from the fourth; the rest, except the basal, producing appendages the basal cells of which give rise to one or often two free branches distinguished by black constricted basal septa, suberect, rigid, appressed or hardly divergent, the slightly tapering extremities becoming disorganized and seldom reaching to the tip of the perithecium. Basal cell of primary appendage not distinguished from those of the receptacle, its outer margin enlarged and bulging so as to throw the insertion of the free appendage inward; the latter short, distinguished by a black septum. Perithecium quite sessile, short and stout, rarely longer and more slender, the outer margin nearly straight, or less convex than the inner, the tip undifferentiated, or sometimes indicated by a slight depression; the apex subhyaline, its distal margin straight and oblique, viewed sidewise, owing to a finger-like or tooth-like protrusion upward and inward from its inner angle. Perithecia $100-135 \times 30-36 \mu$. Receptacle, excluding foot and basal cell of primary appendage, $50-85 \times 25 \mu$. Appendages $100 \times 6 \mu$, longest 150μ . Total length to tip of perithecium $160-210 \mu$; the more slender form up to 335μ , through the elongation of the perithecium.

Forming a dense group at the tip of the free upper surface of the abdomen of *Hyperacantha robusta* Ws. and *Hyperacantha* Sp., Nos. 3070-71, Kamerun, W. Africa.

The more slender and elongate form of this species, above referred to, was found protruding from just beneath the tips of the elytra. The material is somewhat scanty and it is barely possible that it may

prove specifically distinct. The projection, or appendage, from the tip of its perithecium is much longer and more slender, and the perithecium itself is long and slender. The difference is probably due, however, to its position of growth.

Dimeromyces Necrotalis nov. sp.

Male individual (single specimen) pale yellowish. Receptacle consisting of four obliquely superposed cells, the three upper producing antheridia; the basal short, its pointed distal anterior angle protruding below the base of the lowest antheridium. The appendage straight, tapering, distally attenuated; the basal cell large and distally symmetrically rounded. Antheridia with a well defined short stout stalk, the efferent tube region and neck both clearly defined, about as long as the stalk and venter; the neck straight, rather stout.

Female individual (single specimen) pale yellowish throughout; consisting of ten cells, the basal narrow and extending horizontally to, or slightly beyond, the base of the first secondary appendage; the rest of the receptacle forming a horizontal series, all the cells except the eighth and ninth, wedge shaped, the points downward; the terminal cell larger, subtriangular, externally abruptly prominent below the base of the primary appendage; which is similar but slightly stouter and somewhat shorter than the secondary appendages, which tend to alternate with perithecia, diverging slightly from one another, straight, tapering throughout, distally usually attenuated, about seven or eight celled; forming, with the perithecia and receptacle, a fan-like structure. Perithecia straight or the stalk curved; the latter well developed, nearly uniform, about as long as the ascigerous portion, which is abruptly distinguished, symmetrically fusiform; the distal half with two or three slight marginal depressions and elevations, the upper distinguishing the tip rather clearly; the apex well defined, about as long as broad, distally rounded. Perithecia $106 \times$ (stalk) $8 \times$ (ascigerous portion) 15μ . Longer appendages $75 \times 7.5 \mu$ at base. Horizontal cells of receptacle $35 \times 10 \mu$.

On antennae of *Necrota Africana* Gr., Kamerun, West Africa. No. 2577.

This species is represented by two mature and perfect individuals and an additional female, in which the perithecia are still young. Its chief interest lies in the fact that it illustrates very clearly the ease with which the *Dimeromyces*-type may run into the *Dimorphomyces*-

type: since a very slight variation in the method by which the intercalary cells of the horizontal axis are cut off from the basal cell, would make it conform entirely to the characters of the last mentioned genus. In the present instance, however, the subbasal cell which bears the primary appendage becomes displaced so as to end the horizontal series on one side, the extension of the basal cell keeping pace only with the last two or three cells separated from it at the other extremity of the series, below which it forms a short margin.

***Dimeromyces unguipes* nov. sp.**

Male individual rather evenly tinged with pale brown: slender, erect, the foot long, slender and claw-like. Receptacle consisting of three cells; the basal much longer, and but slightly broader distally; the subbasal narrow and oblique, prominent below the base of the erect antheridium; which arises from the distal cell and reaches above the apex of the 3-celled somewhat tapering erect terminal appendage. Antheridium with a well developed free stalk somewhat shorter than the parts above: the venter stout and rather short, more prominent distally and externally, the antheridial cell tube region and the efferent neck short, of about equal length, clearly distinguished and bent slightly inward. Antheridium $38 \times 9 \mu$. Receptacle, without foot, $34 \times 8 \mu$. Appendage 27μ . Total length to tip of antheridium 80-90 μ .

Female individual rather slender, erect; the foot long and claw-like; the receptacle consisting of five obliquely superposed cells; the three mid-cells much flattened and obliquely superposed, the basal much longer, the third producing a secondary appendage, the fourth a perithecium. Primary appendage of three successively smaller cells, the distal darker; secondary appendage nearly twice as long, the basal cell longer than the three terminal ones combined, the two mid cells darker brown. Perithecium straight, erect, slender; its greatest width just below the tip, whence it tapers gradually and evenly to the narrow insertion; the stalk well developed, but not distinguished clearly from the body, which is more deeply tinged with brown for some distance below the tip, the lower half of this darker area marked by fine transverse lines which correspond to slight ridges which extend nearly to the insertion of the stalk: the tip and apex blunt conical, subsymmetrical. Perithecium $135 \times 16 \mu$. Secondary appendage $66 \times 8.5 \mu$; primary $34 \times 6 \mu$. Receptacle without foot, $42 \times 16 \mu$. Total length to tip of perithecium 180 μ .

On the elytra of *Eustilbus apicalis* Shp., Agua Caliente, Guatemala. (Kellerman).

Among the few specimens of this species which are available only two males and a single female are uninjured, so that more copious material will probably necessitate some modification of the above description. The species is so well defined, however, that I have felt it safe to include it in the present enumeration. Its claw-like foot, transversely ridged perithecium, the form of which is otherwise characteristic, the characters of the secondary appendage with its greatly elongated basal cell, as well as the structure of the slender male with its relatively large, distally and externally hunched antheridium serve clearly to separate it from other known forms.

***Dimeromyces eximius* nov. sp.**

Male individual relatively large. Receptacle nearly opaque, except the basal and the lower portion of the subbasal cell; consisting of about five superposed cells, the lower two much flattened, terminated by an undifferentiated appendage consisting of two cells; the lower much larger, the upper shorter and narrower, slightly translucent, especially its flattish distal margin. The successive cells of the receptacle above the basal, producing an anterior series of unicellular branches, or protrusions, from each of which may arise one or more antheridia or appendages or both combined; the appendages stiff, simple, faintly brownish, rather closely septate, the septa darker and slightly constricted, slightly divergent; the antheridia sessile, rather short and stout, the three regions very clearly distinguished; the neck short, stout, distally rounded and slightly broader, curved slightly inward; the venter large, faintly brownish; the middle efferent region contrasting red-brown: the insertion blackened. Receptacle, including large foot, $58 \times 15 \mu$. Primary appendage $22 \times 12 \mu$; secondary 130μ or more, $\times 8 \mu$. Antheridia $38-44 \times 13 \mu$. Total length to tip of appendage 82μ .

Female individual similar in structure to the male, the secondary appendages more numerous and elongate, curved upward and inward, distinctly brownish, the septa darker, with a slight constriction. Primary appendage indistinguishable, the axis quite opaque above the basal cell. Perithecia one or two, lying at the left, like the antheridia, while the secondary appendages, except two or three of the lowest, lie at the right: the stalk very short, nearly hyaline, abruptly bent;

the rest deeply suffused with reddish brown, large, broader distally, almost opaque; the tip-region translucent, defined above and below by a clear fine dark line; the apex larger and longer than the tip-region, asymmetrical, tapering rather abruptly, the inner two thirds much darker, especially the prominent overarching upper lips; the outer third concolorous with the tip-region. Perithecia $135-160 \times 32-38 \mu$. Secondary appendages, longest, $275 \times 9 \mu$. Axis, including foot and primary appendage, $100-110 \times 23-25 \mu$.

On the anterior legs of *Pachyteles* sp., Verdant Vale, Arima, Trinidad, No. 2821.

The characters of this striking species are very aberrant owing to the presence of short unicellular branches, or protrusions, from which, in the male, both appendages and antheridia, and in the female appendages and perithecia, may be formed. In general appearance it recalls to a certain extent certain individuals of *D. pinnatus*, although the structure differs fundamentally, since in this form appendages arise on opposite sides of the receptacle. The form and coloration of the antheridia is very striking and the antheridial cells are unusually numerous, at least six being present.

Dimeromyces Caribbaeus nov. sp.

Male individual hyaline, erect, slender. Receptacle consisting of from four to seven cells, straight or slightly curved backward. Appendage four- or five-celled, the rounded subbasal cell distinguished by a black septum. Antheridia two to six, hyaline throughout, rather slender, the stalk relatively long, the neck well distinguished, rather stout slightly bent. Antheridia $28 \times 5.5 \mu$. Receptacle $38-45 \times 8 \mu$. Appendage $26-32 \mu$.

Female individual almost exactly similar to that of *D. Petchi*, the perithecium is however less strongly bent to one side, less deeply colored, the whole noticeably larger than the receptacle, the tip-portion slightly but characteristically inflated, distinguished by a distinct constriction and contrasting black ring at its base. The basal cell of the primary appendage broadly oval, not flattened and contracted distally, as in *D. Petchi*. Perithecium $65-76 \times 20-22 \mu$. Receptacle $48 \times 18 \mu$. Primary appendage $25-30 \mu$, secondary up to 55μ . Total length $100-120 \mu$.

On the legs and inferior anterior thorax of *Perigona* sp., No. 2920, Grand Etang, Grenada, B. W. I.

Were it not for the striking differences between the males of this species and of *D. Petchi* it would be difficult to separate them satisfactorily by means of the female. They seem, however, to differ rather constantly in the points above referred to, and individuals of the two may be sorted out in almost every case by the relative size of the perithecium and receptacle. Were it not for the striking differences seen in the males I should not, however, have hesitated to unite them under one name. This difference rests in part on the general form of the receptacle, but especially on the form and coloration of the antheridia; which, in the present species, are quite hyaline, relatively long and slender, with well developed necks straight or but slightly curved. In *D. Petchi*, on the other hand, the antheridia are short and stout, the region occupied by the individual discharge tubes quite black, ending in a hood-like conformation from which the hyaline neck, stout and hardly longer than broad, projects almost at right angles. In all the considerable material examined from Ceylon, Java, Borneo and the Philippines there are no individuals which show a transitional tendency.

***Dimeromyces Gonocnemalis* nov. sp.**

Male individual erect, slender. Receptacle consisting of from two to five cells, subequal above, the basal cell much elongated, the rest somewhat oblique, slightly flattened. Appendage consisting of four to five successively smaller cells, distally more or less conspicuously enlarged and tinged with dark brown. Antheridia borne on a long slender hyaline stalk, slightly divergent, straight, the neck and venter more or less deeply tinged with purplish brown, the neck well distinguished, subulate. Receptacle $34-50 \times 9 \mu$. Appendage $64 \times 8 \mu$ at base. Antheridia $50 \times 9 \mu$, the stalk $20-22 \mu$: the antheridia and appendage usually diverging slightly from one another.

Female individual very variable in size. Receptacle usually curved strongly backward, hyaline to pale yellowish, the upper half or more becoming rather deeply tinged with smoky brown: consisting of eight to sixteen cells, more or less, greatly flattened below, oblique only through the general curvature. Primary appendage not abruptly distinguished from the receptacle, soon broken, consisting of not more than six or seven cells, the two or three lower becoming brownish, deeper, and contrasting distally: secondary appendages longer, tending to alternate with perithecia, erect and rather rigid or somewhat

sinuous, often elongate, two or three to ten, two to four or more of the terminal cells often rather abruptly somewhat smaller, and forming a more or less characteristic termination; the cells eighteen, more or less, in number, many of them abruptly somewhat broader distally than the base of the cell next in order. Perithecia one or two to eight, more or less; the stalk-portion well developed, elongate, but not usually clearly distinguished from the ascigerous portion, which becomes rather deep red-brown; the stalk yellowish, or tinged with pale brown; the whole straight and rigid, or slightly sigmoid, tapering distally to the undifferentiated tip, and rather bluntly pointed apex. Perithecia, largest $300 \times 25 \mu$, the ascigerous portion about 140μ , but varying to much smaller dimensions. Receptacle about $60-80 \times 15-20 \mu$. Primary appendage $125-170 \times 12 \mu$: longer secondary appendages $300-425 \mu$, more or less.

On the elytra of *Gonoenemis* sp. Nos. 2356 and 2633, Kamerun, W. Africa.

This species is most nearly allied to *D. maculatus* from which it differs in its immaculate appendages, short perithecia and quite different receptacle. The male is also at once distinguished by its comparatively short appendage and long-stalked antheridia.

***Dimeromyces maculatus* nov. sp.**

Male individual pale yellowish, becoming tinged with brownish. Receptacle rather stout, clavate or brush-shaped, consisting of from five to ten cells greatly flattened and very oblique; the basal larger and usually abruptly bent. Primary appendage erect, rather elongate, tapering; the basal cell larger, the subbasal dark red-brown and distinguished by dark septa and constrictions; the third somewhat smaller, often dark and slightly inflated; the rest of the appendage pale, tapering, its lower cells sometimes darker and slightly inflated. Antheridia one or two to seven, sometimes associated with one, or rarely two, secondary appendages similar to the primary, but longer and stouter, with longer basal cells. Antheridia nearly sessile, the regions clearly distinguished; nearly straight, the neck long and slender, its base and tip hyaline, the rest brown, as is the clearly distinguished efferent region below it. Receptacle $50-65 \times 20-25 \mu$. Appendages, primary, $115-150 \mu$; secondary, longer, 190μ . Antheridia slightly divergent, average, $48 \times 9 \mu$.

Female individual showing extreme variations in size and develop-

ment of appendages. Receptacle faintly yellowish, becoming tinged with brown, the posterior margin narrowly edged with deep black-brown, tending to become short and stout with the upper part of the anterior margin horizontal, or nearly so; consisting of eight to thirteen cells, very greatly flattened, very obliquely superposed, or the transverse axis of the upper almost vertical. Primary appendage similar to that of the male: secondary appendages two or three to six or seven, stouter; a basal portion consisting of from one to rarely six stouter, paler cells marked by scattered brown spots, and a more slender, darker terminal portion one or more of the lower cells of which are abruptly darker, the basal sometimes almost opaque, with straight or slightly concave margins; those just above it often distinguished by dark septa and slight constrictions, the whole terminal portion resembling the primary appendage in a general way. Perithecia variably elongated, one to several, the stalk-portion sometimes much longer than the ascigerous part and rather clearly distinguished from it, but not always: at first pale, except the contrasting clear reddish brown tip which subtends the short, rather flat hyaline apex. Perithecia $100-360 \times 20-30 \mu$. Receptacle $80-110 \times 25-45 \mu$. Primary appendage $125-200 \mu$, secondary $150-550 \mu$.

On the elytra and inferior thorax of *Sphaerostylus Wyliei* Murr. No. 3089, Kamerun, W. Africa.

This striking species is most nearly related to *D. Africanus* and *D. Gonoemalis*, from which it is most easily distinguished by the form of its receptacle and the peculiar maculation of the basal cells of its secondary appendages. In the individuals of a group growing at the base of the mid-legs the perithecia and appendages are very greatly developed, the maculate basal cells especially, being larger and more numerous. The individuals occurring elsewhere are almost uniformly much smaller, with rarely more than one maculate basal cell, and the differentiation between the basal and terminal portions usually far more pronounced.

***Dimeromyces decipiens* nov. sp.**

Male individual (seen edgewise) rather slender; receptacle of two cells, deeply tinged with reddish brown, except the anterior margin and the base of the much larger basal cell. Appendage three-celled, the basal evenly brown, contrasting abruptly with the other two which are hyaline, taper slightly to the blunt tip, and are separated

by a slightly oblique thin blackish septum. Antheridium somewhat longer than the receptacle and appendage combined, the neck very long and slender, slightly curved. Antheridium $57 \times 7.6 \mu$. Appendage $19 \times 5.5 \mu$ at base. Receptacle without foot, 28μ . Total length to tip of antheridium 84μ .

Female individual irregularly furcate in habit. Axis consisting of twenty cells, more or less, obliquely superposed, the basal much longer and hyaline, or translucent below its distal end, and the cells above it deep red-brown, more or less opaque, becoming dirty yellowish translucent brown distally; the series tapering slightly above the middle and ending in a blunt cell without any recognizable primary appendage; the cells bearing rather short, stiff, two- to three-celled secondary appendages, the lower more or less deeply tinged with reddish brown, those above subhyaline; the lowest heterogeneous, deeply suffused, blunt, curved, nearly uniform, of about six hardly distinguishable cells; subtended by the single perithecium which arises from the opaque region of the subbasal cell, its short stalk-portion abruptly curved turning the perithecium sidewise and away from the curvature of the axis: the stalk-region not distinguished, the ascigerous region strongly convex distally and externally, the inner margin straight, or slightly concave; the tip abruptly distinguished by indentations, more abrupt on the inner side, its margins slightly convex; the apex oblique distally and externally rounded and prominent. Perithecia $118-140 \times 22-27 \mu$. Basal (heterogeneous) appendage $50-66 \times 5-5.7 \mu$; the rest about $35 \times 6 \mu$. Total length to tip of axis $140-190 \mu$.

On the inferior surface of the tip of the abdomen of *Eleusis* (*Isomalus*) sp. No. 2359, Kamerun, West Africa.

Owing to the fact that the axis of the female in this peculiar species is so turned that it is viewed for the most part edgewise, it is very difficult to obtain a clear idea of its exact structure. It is perhaps more nearly allied to *D. Thaxteri*, but in the adults, only two of which have been examined, there is no indication of the presence of a primary appendage and the heterogeneous appendage that is present just above the insertion of the perithecium, seems to have no counterpart in other species. It is possible that the axis is the result of a secondary proliferation, but there are no young individuals from which this might be determined. In general habit it is not unlike a somewhat anomalous form of *Rhachomyces*. The male has only been seen viewed edgewise, and owing to the partial opacity of the receptacle the characters of the latter cannot be made out with certainty. The very

long slender neck of the single antheridium and the rather peculiar appendage are its chief peculiarities.

***Dimeromyces ametrothecalis* nov. sp.**

Male individual very pale yellowish, almost hyaline. Receptacle three-celled; including the foot, roughly an inequilateral triangle, bearing a two-celled subulate short appendage from its upper angle, and normally two antheridia from its upper side arising from the nearly equal subbasal and terminal, smaller, triangular cells. Antheridia nearly straight and symmetrical, the upper inclined against the appendage, the lower often slightly divergent; the stalk-cell short and well distinguished; the venter stout, nearly symmetrical; the neck rather long, straight and well differentiated, extending far above the tip of the appendage. Receptacle without foot $21-22 \times 9-10 \mu$. Appendage $13-17 \mu$. Antheridia $30-38 \times 10 \mu$. Total length to tips of necks $63-66 \mu$.

Female individual pale yellowish, becoming tinged with brown. Receptacle relatively minute, consisting of four cells, the basal much larger, the rest successively smaller, somewhat flattened and oblique. Primary appendage short, three-celled, subulate; the secondary single, arising from the subbasal cell, nine or ten-celled, tapering, lying obliquely against the base of the perithecium, the cells mostly broader than long, separated by somewhat oblique septa, and decreasing slightly in size from below upward. Perithecia normally single, arising from the third cell, monstrously developed, becoming more or less deeply tinged with reddish brown; the stalk well developed, curved, but not clearly distinguished from the ascigerous portion, which becomes gradually broader; the tip rather clearly defined, more convex on one side, paler; the apex short, slightly bent, rounded, clearly distinguished. Perithecia $170-400 \times 25-27 \mu$. Receptacle and foot $38-42 \times 12-15 \mu$. Primary appendage $16-20 \mu$; secondary $40-60 \mu$. Total length to tip of perithecium $200-430 \mu$.

On the upper surface of the abdomen of a flat Cucujid, belonging to an undescribed genus, No. 2339, Kamerun, West Africa.

This form does not appear to be nearly related to any other and is very clearly distinguished by its monstrous perithecia, small subulate primary, and straight closely and obliquely septate secondary appendages.

Dimeromyces Copropori nov. sp.

Male individual becoming tinged with brown, short and stout. Receptacle consisting of three cells; the distal more deeply tinged with brown as is the relatively large basal cell of the appendage, which bears a small button-like terminal cell. Antheridia usually two, faintly brownish, short and stout, with short hardly distinguished necks, straight, the stalk short but distinct. Receptacle, without foot, $20 \times 12 \mu$. Appendage 13μ . Antheridia $30 \times 9 \mu$. Total length to tips of antheridia $58-62 \mu$.

Female individual rather uniformly tinged with pale dirty yellowish brown. Receptacle erect, distally somewhat curved backward, consisting of about sixteen to twenty cells, those above the basal flattened, horizontal, except for the distal curvature; those in the mid-region broader, producing either perithecia, or short two-celled abortive appendages which may be mere unicellular protuberances and alternate more or less with the perithecia: the primary appendage two-celled, similar to the secondary, and forming a blunt termination to the receptacle from which it is hardly differentiated. Perithecia paler below and at the apex, nearly sessile, subcylindrical, the tip rather clearly distinguished, darker, tapering to the slightly asymmetrical, broad, blunt termination. Perithecia $100-125 \times 20-25 \mu$. Receptacle, including foot and primary appendage $125-180 \times 25-28 \mu$. Secondary appendages $18 \times 10 \mu$. Total length to tips of perithecia $225-260 \mu$.

On legs of *Coproporus* sp. No. 2620, Kamerun, West Africa.

This very distinct species recalls to some extent the habit of *D. pinnatus* although the organs arise from one side only and the form of the perithecia and appendages is quite different. The host is said by Mr. Arrow to be an undescribed species.

Dimeromyces Roreri nov. sp.

Male individual hyaline, very faintly tinged with yellowish brown. Receptacle consisting of two cells, or rarely three; erect, the appendage three-celled, the middle cell roundish and distinguished by slight constrictions and dark septa. Antheridia one or two, slightly asymmetrical, the stalk free and well developed, the neck moderate and well distinguished. Receptacle, without foot, $12-13 \times 8 \mu$, the foot

small. Appendage $12\ \mu$. Antheridia $38 \times 8.5\ \mu$. Total length 48 – $54\ \mu$.

Female individual nearly hyaline with faint yellowish brown suffusions. Receptacle consisting of six or seven flattened, somewhat oblique and rather irregular cells; the fourth, usually producing the single secondary appendage; the fifth, and sometimes the third, a perithecium. Primary appendage similar to that of the male; secondary appendage of five or six cells, the second and third squarish and distinguished by dark septa. Perithecium asymmetrical, the stalk not distinguished and bent somewhat sidewise; subclavate below the tip, which is clearly distinguished and subtended by a conspicuous transverse brown suffusion associated with a slight constriction; above which the tip is slightly inflated and bent outward below the hyaline slightly inflated apex; which is clearly distinguished by a slight constriction, bent slightly inward, somewhat longer than broad, bluntly rounded. Perithecium 80 – 100×17 – $19\ \mu$. Receptacle 20 – 25×12 – $13\ \mu$. Primary appendage 16 – $20\ \mu$; secondary $42 \times 5\ \mu$. Total length to tip of perithecium 105 – $125\ \mu$.

On the inferior extremity of the abdomen of a species of *Gyrophana* received from Mr. J. B. Rorer from Port of Spain, Trinidad, No. 2306.

Owing to the basal curvature of the perithecium individuals of this species lie as a rule with the receptacle shown edgewise, so that it is difficult to represent the normal sequence of the cells. The form, and subterminal suffusion of the perithecium, which bears a certain resemblance to that of *D. Carribocus*, clearly distinguishes it from other species.

Dimeromyces gracilis nov. sp.

Male individual very minute, the receptacle consisting apparently of but two cells, terminating in a two-celled appendage, the basal cell of which is small and nearly round, the distal cylindrical and several times as long. The single minute antheridium arising from the sub-basal cell, apparently sessile, with a short neck. Total length to tip of appendage $22\ \mu$, the foot $12\ \mu$.

Female individual almost hyaline. The receptacle consisting of four cells and terminated by a two-celled appendage similar to that of the male and quite undifferentiated. The third cell of the receptacle producing the single perithecium, which is long and slender, the stalk-portion not distinguished, of nearly uniform diameter to the

relatively long tapering tip-region, which is not well distinguished, the apex small and rounded. Perithecia $150-190 \times 20 \mu$. Receptacle, including foot, $48-56 \times 12 \mu$. Appendage $20 \times 18 \mu$.

On a myrmecophilus aleocharid, No. 2612, Kamerun, West Africa.

Two mature females of this curious and very simple form have been examined, neither of which, though well developed, bear a secondary appendage although a small cell is separated from the subbasal cell below the insertion of the perithecium. The single male examined is still adherent to the foot of the female, with the antheridium so turned that its structure can only be surmised. The host was taken by Mr. Schwab among a number of Staphilinidae following a procession of soldier ants.

Dimeromyces Gyrophaeniae nov. sp.

Male individual hyaline, faintly tinged with yellowish. Receptacle consisting of four or five somewhat oblique cells; the basal nearly as long as the rest combined. Appendage short, stout, of two subequal cells; the distal thick-walled, slightly broader and rounded. Antheridia three or four, diverging at about 45° , the stalk slightly shorter than the venter and neck; the latter short, straight, conical, hardly distinguished. Receptacle $34 \times 12-13 \mu$. Appendage $17 \times 8 \mu$. Antheridia $30 \times 8.5 \mu$. Total length to tips of antheridia 64μ .

Female individual pale yellowish. Receptacle turned sometimes at right angles to the axis of its basal cell: consisting of usually eighteen to twenty cells, those above the basal very greatly flattened, especially the lower ones: giving rise alternately to perithecia and appendages, which diverge left and right, respectively, projecting upward from the nearly horizontal receptacle. Primary appendage like that of the male; secondary usually four-celled, the three lower subequal, hardly longer than broad, the distal one broader, rounded and thick-walled. Perithecia subclavate, curved, tapering to the slightly bent short tip, and rather small asymmetrical apex. Perithecia $75-80 \times 21 \mu$. Receptacle, above basal cell, $55-70 \times 20-25 \mu$. Primary appendage $17-19 \mu$; secondary 46μ .

On the elytra of a species of *Gyrophaena*: No. 2610, Kamerun, West Africa.

The material of this peculiar species is somewhat scanty, and the perithecia are so irregularly bent that it is difficult to determine their exact outline. The species is allied to *D. Roreri* and *D. Copropori*, but its differences from either are so great as to render a comparison superfluous.

Dimeromyces Platycilibis nov. sp.

Male individual pale yellowish tinged with brown. Axis of the receptacle straight, erect, five- or six-celled; the basal longer subtriangular; the rest somewhat flattened, the middle ones broader: terminal appendage simple, three-celled, the middle cell darker, subspherical, distinguished above and below by blackish septa. Antheridia one to three, strongly divergent, sometimes almost at right angles; stout, with four or more antheridial cells; the necks short, well distinguished, slightly curved outward, stout. Length to tip of appendage 38-48 μ . Antheridia 15-18 \times 7.5 μ .

Female individual yellowish, rather strongly tinged with brownish at maturity. Axis of the receptacle nearly straight and erect, five- to eight-celled; the basal subtriangular, much larger; the rest flattened, the upper somewhat oblique: the terminal primary appendage relatively very small, similar to that of the male; the secondary appendages usually single and subterminal, a second sometimes arising below the usually single perithecium, stout, simple; a basal portion of about six to nine cells slightly longer than broad distinguished from a terminal portion by a constriction associated with a deeper brown suffusion; the terminal part unicellular, or several celled; variably elongate, the walls variably thickened and disorganized, tapering somewhat from a broader base. Perithecia somewhat more distinctly brown, rather short and stout, broader below the tip, thence tapering somewhat asymmetrically to the broad blunt termination, the stalk short or obsolete. Spores about 20-24 \times 2.5 μ . Perithecia 58-68 \times 20 μ . Receptacle, less foot, 25-28 μ . Primary appendage 15-28 μ . Secondary appendages 45-85 \times 10-12 μ , terminal part 45-130 μ .

On the upper surface of *Platyelibe* sp., No. 2986, M. C. Z., Wainoni Bay, Solomon Islands (Mann Coll.).

This species is abundantly distinguished by its minute primary appendage, and the differentiation of its secondary appendages, the terminal portion of which may vary considerably in length, a few short stout forms occurring.

Dimeromyces Aphanocephali nov. sp.

Male individual colorless, erect, the receptacle three-celled, the cells subequal, the upper long-oval, tilted and externally prominent. Antheridium erect, the stalk-cell free only externally, the short neck

hardly divergent and not exceeding the tip of the appendage: total length 35μ . Antheridium 20μ . Appendage $15 \times 3.5 \mu$, free, of two subequal cells.

Female individual colorless. The receptacle and appendages sprawling on the substratum: the former four-celled, the cells flattened and somewhat oblique, the subbasal producing a secondary appendage, which usually tapers and consists of seven or eight cells, arising from the anterior side; while a second buffer-appendage of a similar character grows from the same cell on the anterior side: the terminal primary appendage similar, somewhat larger: all the appendages straight or variously curved, the primary and secondary usually directed away from the buffer-appendage: the whole lying flat on the host, the basal cell much compressed. Perithecium with an elongate stalk arising perpendicularly from the substratum, erect or strongly curved, the ascigerous portion moderately well distinguished, not quite symmetrical, slightly inflated, rather long and slender, terminating in a short, finger-like, erect projection: the lumen of the lower part of the stalk becoming more or less obliterated. Ascigerous part of perithecium $60-75 \times 15-18 \mu$: the stalk $\times 10-11.5 \mu$: the total length $150-240 \mu$. Appendages $50-70 \mu$.

At the tips of the elytra of *Aphanocephalus pubescens* Grouv. No. 1834, Sarawak, Borneo.

In its sprawling habit and the form of its perithecium this species closely resembles *D. appressus*. The characters of the male are, however, quite different and the appendages of the female lack the dark septa and rigid habit seen in this species, while the form of the receptacle is also dissimilar.

***Dimeromyces aberrans* nov. sp.**

Male individual consisting of a small basal and subbasal cell, the latter bearing distally a bluntly pointed terminal cell and subterminally a short stalked antheridium, the neck very short and blunt or nearly obsolete, the antheridial cells apparently two. The subbasal cell sometimes producing two or more branches consisting of a basal cell bearing distally a bluntly pointed terminal cell and subterminally a short stalked antheridium. Total length about 30μ . Antheridium and stalk $11 \times 3.5 \mu$.

Female individual pale yellowish, the broad short basal cell for the most part blackened and indistinguishable from the foot, somewhat

overlapping the small subbasal cell which appears to produce a branch to the right and left; the two similar, rather closely septate, often broader distally, curved upward on either side of the one to several perithecia; one, the secondary appendage, often slightly longer and stouter, than the other, which represents the primary appendage, and is subtended by the first perithecium; a second usually developing from the basal cell of the secondary appendage, accessory perithecia not infrequently arising from cells adjacent to those which produce the first, seldom more than four maturing. Perithecium asymmetrical, irregularly fusiform, the stalk-portion relatively short and tapering to its narrow insertion, not distinguished from the gradually much broader ascigerous portion, which is slightly bent inward distally, strongly convex externally and straight or concave on the inner side below the tip; the apex often bent rather abruptly upward, broad, flat or blunt. Perithecia $55-75 \times 13 \mu$. Appendages $30-48 \times 6-7 \mu$. Total length to tip of perithecium $70-92 \mu$.

On the elytra of *Tomarus atomarius* Sharp. No. 1527, Columbus, Ohio; No. 1609, Los Amates, Guatemala; No. 1599, El Rancho, Guatemala.

The hosts bearing this parasite were collected for me by the late Professor Kellerman to whose kindness I am indebted for numerous other new and interesting forms. The species is nearly allied to *D. Tomari*, from which it differs especially in the form of its perithecia and appendages. Although in specimens which bear two or more perithecia, the general development appears to be more or less bilaterally symmetrical, the structure does not seem to be fundamentally different from that of other species of the genus. The presence of adventitious perithecia might be compared to the much more striking phenomenon seen in *D. adventitosus*, while the development of short branches bearing antheridia finds an occasional parallel in *D. Thaxteri*. The males adhere so closely to the base of the female that they can only be separated with the greatest difficulty, and but few have been clearly seen. The antheridium is not typical, the neck being hardly developed at all, and the antheridial cells but two in number, as far as it has been possible to determine. The antherozoids hardly seem to enter a common tube, but rather to make their exit directly from the neck of the antheridial cell. They are so small, however, and the outlines are so vague, that a definite determination of these points has been impossible.

Dimeromyces Tomari nov. sp.

Male individual nearly colorless: the basal cell about as broad as long; the subbasal much smaller, squarish, bearing terminally a relatively stout three to four celled appendage-like termination, and laterally a single rather stout and short antheridium, its stalk-cell clearly developed, the antheridial cells apparently two, the termination short stout and blunt, the efferent neck hardly if at all developed. Foot somewhat larger than the basal and subbasal cells combined, which measure about $8.4 \times 4.2 \mu$. The appendage-portion $20 \times 4 \mu$. The antheridium, including stalk, about $12 \times 5 \mu$.

Female individual faintly tinged with yellowish, becoming faintly brownish with age. Receptacle consisting of a large basal and smaller subbasal cell, the former tinged with brown below and overlapping the latter distally; the subbasal cell giving rise to a simple somewhat irregular secondary appendage more closely septate below, and on the opposite side to the third cell of the receptacle from which the normally single perithecium arises: the rest of the axis not distinguished from the primary appendage by which it is continued. Perithecium relatively large, the stalk well developed, often broader than the ascigerous portion from which it is not otherwise distinguished, the tip slightly asymmetrical, tapering to the rather broad blunt apex; the ascigerous portion nearly straight on the inner and more convex on the outer margin. Perithecia $80-100 \times 12 \mu$; largest 140μ . Appendages $50-90 \mu$. Basal and subbasal cells $10.5 \times 12.5 \mu$. Total length to tip of perithecia $90-150 \mu$.

On the elytra of *Tomarus bellus* Gronv. No. 2776, Grand Etang, Grenada, B. W. I.

Except for the presence of a secondary appendage, and the different form of its perithecium, this species closely resembles that of *Eudimeromyces Chiliotis*, and it is possible that the difference in the male on which the latter genus was based may be less fundamental than was at first supposed. In the present species the male has been clearly seen in several instances to possess a compound antheridium borne on a short stalk-cell from the subbasal cell. A reëxamination of the material of *Eudimeromyces*, however, seems clearly to show that no lateral compound antheridium is produced by the male; but the terminal cell of the four-celled individual seems to become an antheridium as in *Dioicomycetes* and *Amorphomyces*. Examination with the highest powers available indicate, however, that the basal part of

this flask shaped terminal cell is longitudinally divided, and that the structure may after all prove to be a compound antheridium. It should be borne in mind, however, that these appearances may be misleading and the terminal cell referred to may be neither a simple nor a compound antheridium; and that, if abundant material were examined, compound antheridia might be developed laterally in some instances. In the dozen individuals examined, no indications have been seen of such an organ. A second type, on *Chiliosis*, *Eudimeromyces Andicolus*, has apparently been described by Spegazzini under *Corethromyces*; but he apparently overlooked the male, and was misled as to the generic relationships of his form. His figure clearly shows the coalescence of the stalk- and basal-cells of the perithecium which is known only in a few unisexual genera.

Dimeromyces Tomoderi nov. sp.

Male individual, hyaline or becoming faintly tinged with brownish yellow. Receptacle two-celled, the basal flattened, oblique, somewhat bulging and blackened anteriorly; the subbasal hardly larger, its sides converging to the base of the free appendage; which consists of two subequal cells, about as broad as long, the extremity symmetrically rounded. Antheridium single, relatively large and elongate; the free stalk-cell almost twice as long as broad; the antheridial cells two or three, large; the neck about as long as the venter, rather stout, straight and not abruptly distinguished. Receptacle $8 \times 7 \mu$. Foot $8-10 \mu$. Appendage $8-9 \times 3.5 \mu$. Antheridium $28 \times 5 \mu$.

Female individual pale brownish yellow, the perithecium darker brown. Receptacle consisting of four somewhat obliquely superposed cells, somewhat flattened, the distal bearing the simple three- to four-celled primary appendage subterminally on the right side; the subbasal cell bearing the single secondary appendage; which is simple, four- to five-celled, nearly uniform, blunt, similar to the primary one: the subterminal cell bearing the sessile perithecium, which is short and stout, asymmetrical, straight or slightly concave posteriorly, strongly convex anteriorly, tapering from above the middle to the snout-like termination which forms a more or less prominent anterior projection and is more or less oblique inward. Perithecia $50-55 \times 20-22 \mu$. Appendages $18-25 \times 4 \mu$, the primary shortest. Receptacle $20 \times 14 \mu$, exclusive of foot. Total length to tip of perithecium $80-90 \mu$.

On the femur of the anterior leg of *Tomoderus* sp. No. 2590, Kamerun, West Africa.

This small and compact form is not to be confused with any of the described species, and is characterized by its simple short undifferentiated appendages, and peculiarly shaped stout sessile perithecium. The male is especially characteristic from the relatively great size of its erect antheridium, which seems usually to possess but two antheridial cells.

DIMEROMYCES ANISOLABIS Thaxter.

This species has been found, since its original publication, on *Euborellia Janeirensis* Dohrn, Nos. 2257 and 2263, from Independencia and Ceara Mirim, Amazon, in the Mann collection, M. C. Z., the only evident difference from the type appearing in the more prominently geniculate habit of the basal cell of the lower secondary appendage. Specimens have also been examined on *Euborellia* from the Solomon and Fiji Islands, Nos. 3015, 3017 and 3018 also collected by Mr. Mann. This last form is smaller than the type, the basal cell of the primary appendage always producing two branches, distinguished by dark septa, radially placed. The lower secondary appendage also produces two branches from its basal cell in about half the individuals.

Dimeromyces Prorei nov. sp.

Male individual slender, hyaline; the basal much longer than the obliquely separated subbasal cell; the basal cell of the appendage somewhat smaller, separated from the erect three-celled free portion by a dark septum. Antheridium usually single, somewhat divergent, the venter rather well distinguished from the neck and tube, which is curved outward. Total length to tip of appendage, including foot 50μ . Antheridium $20 \times 5 \mu$.

Female individual rather short and stout. Basal cell somewhat triangular; subbasal much smaller, flattened, triangular; bearing anteriorly the short externally rather prominent basal cell of the secondary appendage; which is separated from the free portion by a constriction and dark septum, above which the first three cells are usually somewhat differentiated, tinged with smoky brown, the lowest especially, strongly convex below on the inner side, so that the appendage diverges; the distal portion more slender, hyaline and tapering.

Basal cell of the primary appendage free, diverging from the distal end of the small short fourth cell of the receptacle; which is slightly bent outward distally, and bears from one to three radially disposed branchlets distinguished by dark septa; the branchlets hyaline, simple, slightly tapering, the two appendages often diverging almost symmetrically on either side of the perithecium which rises between them from the third cell of the receptacle; and is short stalked, or nearly sessile, straight, somewhat asymmetrical, very slightly inflated; the apex bent inward and distinguished, especially on the inner side, by a variably well marked indentation; the inner lip slightly more prominent. Spores about $30 \times 4 \mu$. Perithecium $65-80 \times 8-9 \mu$. Receptacle $30-34 \times 18 \mu$. Secondary appendage $80-125 \mu$. Total length to tip of perithecium $85-105 \mu$.

On the inferior abdomen and forceps of *Proreus simulans* Stal. from cane sheaths. No. 3134, Los Baños, Laguna, P. I., W. H. Weston.

This species is most nearly related to *D. Forficulae* from which it is most readily distinguished by the nearly horizontal septum which separates the basal and subbasal cell, the latter being subtriangular with its distal angle nearly median, while the receptacle of *D. Forficulae* consists of four successively narrower cells, their septa very oblique and nearly parallel. There is but one secondary appendage, the lower, developed in the present species, the character of which as well as of the perithecium is somewhat different.

Dimeromyces Australasiae nov. sp.

Male individual colorless, straight, erect, rather slender; the axis consisting of three cells; the basal much longer, terminated by the basal cell of the appendage, which may bear one or two short, two-celled branches distally, each separated by a dark basal septum. Stalk-cell of the antheridium small, the regions rather clearly distinguished by indentations on the inner margin: neck subgeniculate bent or curved more or less strongly outward. Axis, including basal cell of appendage, $38-44 \times 9 \mu$. Antheridia $24-28 \times 7 \mu$. Total length to tips of appendages, including foot, $60-75 \mu$.

Female individual very faintly tinged with purplish brown. Receptacle consisting of four obliquely superposed cells; the basal as long as the rest combined, more or less strongly curved above the foot, and bulging on the posterior side: the subbasal cell bearing the first

secondary appendage, the basal cell of which is rounded, distally narrowed, and bears a single peculiar divergent two-celled branch, the basal cell of which is strongly convex on the inner side and separated by a usually conspicuous constriction from the somewhat longer tapering stiff distal cell: the third cell of the receptacle bearing the single perithecium, its stalk hyaline, sometimes longer than the body, mostly straight, the body nearly symmetrically subfusiform; a slight but variable indentation of the outline below the tip on the inner margin, and a rather abrupt indentation below the apex externally; the latter oblique, the outer lip very prominent, extending up over the inner, distally rounded. The terminal cell giving rise to a second secondary appendage on the inner side, the large basal cell of which produces an oblique series of three to five simple three-septate, nearly cylindrical, hyaline branches distinguished by closely set dark basal septa; the whole being entirely similar to the basal cell of the terminal primary appendage, which it overlaps. Spores about $30 \times 3.5 \mu$. Perithecia, body $50-75 \times 20 \mu$, stalk-portion $30-100 \times 9-12 \mu$. First secondary appendage, including basal cell, $38-42 \mu$. Branches of primary appendage, $22-38 \times 3.5 \mu$.

On the inferior surface of the abdomen and forceps of *Chelisoches morio* (Fabr.) Nos. 2949 and 3012, Auki, No. 3026, Florida; Solomon Islands. Nos. 3014, Nausori, No. 3013, Viti Leon, No. 3027, Nadarivata, Fiji Is., Mann Coll., M. C. Z.

This species is well distinguished by the basal cell of the primary and upper secondary appendage, which resemble the basal cells of the branches of the appendages in forms like *Laboulbenia pusilla*. The tip of the perithecium, and the lower secondary appendage, are also quite distinctive.

DIMEROMYCES APPRESSUS Thaxter.

This species was first obtained from east Indian species of *Labia*, and has since been collected in Trinidad, B. W. I., on a similar host. The West Indian material does not differ essentially from the type.

Dimeromyces Chaetospaniae nov. sp.

Male individual similar to that of *D. appressus*. Somewhat larger. The basal cell almost wholly blackened, extending beyond the stalk-cell of the antheridium, and separating a small distal cell which forms

a subtending rounded prominence: the subbasal cell large, obliquely separated. The basal cell of the appendage giving rise to a terminal and sometimes also to one or two subterminal external branchlets, their basal cells distinguished by dark septa, their subbasal (terminal) cells hardly exceeding the tip of the stout antheridium, which is abruptly curved outward. Total length to tip of antheridium, including foot, 35-38 μ . Antheridium 15-17 \times 7 μ .

Female individual somewhat blackened above the foot, the suffusion involving part of cell one and three. At first somewhat spatulate, becoming prostrate; compact, the subbasal cell small and misplaced by the third cell, which bears the single perithecium and appears to be subbasal in position: somewhat obliquely separated from the fourth cell which is distally abruptly prominent below the basal cell of the primary appendage; which, in addition to the terminal branch, may bear two or even three accessory branchlets externally, three-celled, the two lower distinguished by dark septa; the fourth cell also producing distally and inwardly a second secondary appendage, the basal cell of which may bear from one to three branchlets, similar to those of the primary. The first secondary appendage arising from an undifferentiated basal cell, externally prominent, like the subbasal cell of the receptacle which lies below it; bearing a single three-celled termination, the two lower cells distinguished by dark septa. The receptacle, and the appendages with their branches, lying at maturity in the same plane and seen edgewise; the perithecium usually relatively stout, the neck about as long as the body and often not very clearly distinguished from it; the tip slightly and abruptly bent inward, snout-like, inconspicuously sulcate, broad; the whole projecting upward from the prostrate receptacle at an angle of usually 45°. Spores about 20 \times 3 μ . Perithecium including stalk, 75-130 \times 13-15 μ . Appendages, including basal cell, 20-30 μ . Receptacle, seen flatwise, including foot, 28 \times 20 μ .

On the inferior surface of the abdomen and forceps of *Chaetospania thoracica* Dohrn., No. 2126, Sarawak, Borneo.

Although closely allied to *D. appressus* and having much the same habit of growth, this species is clearly distinguished by its appendage, as well as by other points. The stalk of the perithecium, in some instances, may be more slender and clearly distinguished from the shorter body, as in *D. appressus*, though never to such a degree. The actual structure of the receptacle and the origin of perithecium and appendages can only be made out in young individuals.

Dimeromyces moniliformis nov. sp.

Male individual. Axis prostrate, consisting of three cells, continuous, with the short straight four-celled terminal appendage, the subbasal cell of which is slightly inflated and distinguished below by a slight constriction and black septum. Axis of the antheridium parallel to that of the receptacle, its stalk-cell externally convex, bulging strongly and extending down so as to overlap the distal end of the basal cell; its venter rather stout, slightly inflated, the neck rather short and stout, curved outward distally. Antheridium and stalk $30 \times 6 \mu$. Appendage and receptacle, including foot, 50μ .

Female individual nearly hyaline, with faint tinges of purplish brown. Receptacle prostrate, the axis consisting of four subtriangular cells, the second and third wedge-shaped. The primary appendage similar to that of the male, four-celled, the subbasal cell more prominently distinguished by a constriction and black septum; its upper septum also slightly blackened. Subbasal cell of the receptacle bearing the single secondary appendage, its basal cell overlapping that of the receptacle, strongly prominent and rounded externally; its distal end abruptly narrower, and turned upward to join the nearly hyaline subbasal, which is distinguished from it by a blackened oblique septum: the three succeeding cells slightly suffused, rounded, with strong intervening constrictions, and very broad black septa, the two lower distally oblique; the fourth somewhat larger, wholly and more deeply suffused with purplish brown, the blackened septa narrower; the fifth still larger; the rest of the appendage two- to three-celled, without prominent constrictions, distally tapering slightly to a blunt termination; the whole curved outward and diverging more or less from the perithecium. Perithecium slightly curved inward, normally single, and arising from the third cell of the receptacle; the stalk hyaline, not well distinguished, about as long as the main body which is pale brownish, modified by four successive nearly equidistant and symmetrical enlargements, the upper, which involves the base of the tip, less prominent. Spores about $30 \times 4 \mu$. Perithecia, including stalk, $125-145 \times 12-20 \mu$. Primary appendage $25-34 \mu$: secondary $100-110 \times 8 \mu$, at base, $\times 12 \mu$ distally. Total length to tip of primary appendage $58-66 \mu$, including foot.

On forceps of *Labia mucronata* Stal., No. 2139A, Sarawak, Borneo.

This species is very clearly distinguished by the moniliform base of its secondary appendage and the successive enlargements of the

perithecium. The latter is solitary in all the specimens examined, but the fourth cell of the receptacle separates a small cell which may perhaps sometimes develop a second perithecium or secondary appendage.

***Dimeromyces annulatus* nov. sp.**

Male individual very faintly tinged with brownish, the receptacle of two cells, the subbasal subtriangular, bearing the undifferentiated basal cell of the simple appendage distally, and laterally and obliquely the solitary antheridium; which is rather stout, erect, the stalk-cell oblique, the venter somewhat inflated, the neck rather short and stout, distally strongly curved outward. The appendage erect, simple, three-celled, the subbasal cell slightly narrower, squarish, distinguished by dark septa. Length to tip of appendage $28 \times 7.5 \mu$. The antheridium $17 \times 5.5 \mu$.

Female individual pale brownish, the receptacle spathulate or subtriangular, consisting of four superposed cells, which become more or less displaced by a prominent bulging of the third cell on the posterior side, and by the enlargement of the basal cells of the three appendages. Primary appendage four-celled, the subbasal short, somewhat narrower, and distinguished by dark septa; the three terminal cells of the receptacle flattened and broad; the third bearing the perithecium and protruding posteriorly; the second producing the first lateral appendage; the third the primary and a second lateral appendage, both the latter distinguished below by the presence of broad short cells separated by dark annular septa, of which there may be five to six in the second and somewhat fewer in the first; the termination of the appendages hyaline, slightly inflated, their total length not half that of the perithecium, from the base of which they may diverge slightly. Perithecium very slightly curved, somewhat asymmetrical, its base broad without any differentiated stalk-region, tapering slightly, distally, to a blunt slightly asymmetrical termination. Spores about $32 \times 2.5 \mu$. Perithecia, larger $56 \times 10 \mu$. Primary appendage $20 \times 5 \mu$; larger secondary $30 \times 3.5 \mu$. Receptacle $13-15 \times 13 \mu$.

On the inferior abdomen of *Chaetospania paederina* Gerst. No. 2205, Kamerun, W. Africa.

This minute species is most nearly related to *D. appressus* from which it is readily separated by its annular appendages and sessile perithecium. The compact and relatively small receptacle appears

quite differently from different points of view, and through secondary displacement and the presence of a dorsal outgrowth of its third cell, the original cell-arrangement is often difficult to recognize.

***Dimeromyces lobatus* nov. sp.**

Male individual consisting of three cells; the basal abruptly more than twice as broad distally, forming a shelf on which the broad flat subbasal cell rests; the third cell narrower: appendage erect, terminal, its basal cell undifferentiated, slightly narrower distally, separated from the subbasal by a somewhat constricted deep reddish cup-like septum, the distal portion two-celled, tapering to a blunt point. Antheridium arising from the third cell of the receptacle, sometimes also from the second, parallel to and in close contact with the appendage, the neck rather long and stout, slightly curved outward, subtended by a slight prominence above the somewhat inflated but narrow venter. Total length, including foot ($18\ \mu$), $65\ \mu$. Basal cell $\times 8\ \mu$ below and $\times 14\text{--}16\ \mu$ distally.

Female individual. Receptacle four-celled, otherwise similar to that of the male, the basal cell of the primary terminal appendage undifferentiated, the subbasal distinguished by a more conspicuous constriction and dark septum. Secondary appendages arising from the second and fourth cells, the latter tapering, subhyaline, distinguished above its somewhat rounded basal cell by a dark septum; the former large, externally and distally tinged with deep blackish brown; its basal cell somewhat rounded, separated from the subbasal by a constriction and broad black septum: straight, slightly divergent, five-celled; the terminal cell producing three or four short, stout, recurved, deep brown branchlets or lobes. Perithecius arising from the third cell, the stalk well developed (the ascigerous region immature). Primary appendage $25\text{--}50\ \mu$; lower secondary, $40\text{--}50\ \mu$. Receptacle, including foot, $40\text{--}50\ \mu$.

On forceps of *Echinosoma Congolense* Bor. No. 3104, Kamerun.

Owing to the fact that the perithecia are immature, I have described this species with reluctance. Its peculiarities are such, however, that it is not likely to be confounded with any other, the lobed branching of the distal cell of its lower secondary appendage being unique. The males are mature and peculiar. About twenty specimens have been examined.

Dimeromyces 1-flagellatus nov. sp.

Male individual colorless, the axis straight, three-celled, the basal cell very large, of nearly uniform diameter; the subbasal usually smaller than the basal cell of the appendage, which is obliquely separated from it: both cells more often bearing slender, somewhat divergent antheridia, slightly curved outward throughout; appendage evanescent, slender, two-celled. Axis (three cells) $25-30 \times 5.5 \mu$. Antheridia $25 \times 4 \mu$. Basal cell $20 \times 5.5 \mu$.

Female individual erect, straight nearly hyaline. Receptacle consisting of five-cells, the basal very large, sometimes longer than the rest combined, the second or third cell bearing the single sessile perithecium; the two obliquely separated, subequal, more flattened than the two above; all separated by slight marginal indentations; the subbasal often cutting off a small cell distally and anteriorly; the only appendage primary, terminal, slightly divergent, somewhat moniliform and reddish brown below; its basal cell large, usually slightly concave externally, the subbasal very small almost square, more deeply suffused, the two or three cells above larger, more rounded, somewhat less suffused; the three to five distal cells pale, the terminal one usually much longer. Stalk of the perithecium usually wholly undistinguished, straight, an external elevation often submedian, thence tapering asymmetrically to the blunt termination, the outer lip-cell large and somewhat spoon-shaped, lying over the inner. Spores (female) $28 \times 2.5 \mu$. Perithecia $50-60 \times 13 \mu$. Appendage $75-90 \mu$. Total length to tip of perithecium $95-105 \mu$. Basal cell, largest $42 \times 10 \mu$.

On the head and prothorax of *Spongorostrax alter* Burr. Porto Vehlo, Amazon, Mann Coll., No. 2242, M. C. Z.

This peculiar species differs in the absence of any secondary appendages, in its elongate basal cell and usually quite sessile perithecium. The appendage of the male has only been seen in a shriveled condition, and is quickly destroyed. The antheridia may be solitary or more often two superposed, and are slender, with long attenuated necks.

DIMEROMYCES THAXTERI Maire.

This very peculiar and somewhat anomalous species which was first observed on *Gryllus* from Java, and inadvertently described by me

under the preoccupied name *D. falcatus*, already used by Paoli for a species on mites, has been again found on a species of *Gryllus* from Wainoni Bay, Solomon Islands, and also on a small cricket of an apparently different genus from the Zamboanga District, Mindanao, P. I.